Employee Incentives Engineering: Towards a Decision Support System

Erik Loots

Dissertation presented for the degree of

Doctor of Philosophy in Industrial Engineering

in the Faculty of Engineering at Stellenbosch University

Supervisor: Prof. CSL Schutte

December 2017

DECLARATION

By submitting this dissertation electronically, I declare that the entirety of the work contained therein is my own, original work, that I am the sole author thereof (save to the extent explicitly otherwise stated), that reproduction and publication thereof by Stellenbosch University will not infringe any third party rights and that I have not previously in its entirety or in part submitted it for obtaining any qualification.

December 2017

OPSOMMING

Een van die hoof uitdagings wat organisasies in die gesig staar is hoe om hulle werknemers se vlak van werkverrigting te verhoog. Hierdie navorsing se fokus is gerig op hoe om aansporingsgebruike aan te wend sodat dit werknemermotivering stimuleer. Alhoewel daar verskeie nuttige modelle is wat met die ontwikkeling van 'n aansporingsplan geraadpleeg kan word, spreek dit nie oorwegings aangaande die ontwerp daarvan in voldoende detail aan nie.

Met die erkenning dat organisasies se werksverrigting negatief deur werknemers wat nie behoorlik gemotiveer word nie, beïnvloed word, en dat die bestaande navorsing uitgebreid maar tog moeilik bruikbaar is, het hierdie navorsing oorweeg hoe organisasies die bestaande literatuur kan aanwend. Hierdie uitdaging word aangespreek deur die ontwerp van 'n Besluitsnemingsondersteuningstelsel (BOS) wat gebruik kan word om 'n organisasie se werknemeraansporingsgebruike te verbeter. Die navorsing neem die benadering van stelselsingenieurswese aan, met probleemoplossing as kern en pragmatisme as hoof filosofiese perspektief, en benut verskeie dissiplines om probleme, wat se oplossings buite die bestek van 'n enkele dissiplines val, op te los.

Die navorsing is in twee hooffases verdeel: 'n gestruktureerde literatuurstudie en die ontwerp van 'n BOS. Alhoewel die bevindinge van die gestruktureerde literatuurstudie en die BOS wat ontwerp is streng en gedetaileerd is, is dit belangrik om uit te wys dat die antwoord op die navorsingsvraag in die prosesse en die onderliggende raamwerk wat die navorsing ontwerp het lê. Moontlike verdere ontwikkeling in die teoretiese landskap dienooreenkomstig werknemermotivering en –aansporing hou daarom geen probleem voor nie; die gestruktureerde literatuurstudie kan enige tyd herhaal word om dit te weerspieël, en die BOS kan aangepas word om enige veranderinge in die bevindinge te inkorporeer.

Die eerste fase van hierdie navorsing identifiseer dertien Primêre aansporingsplanontwerp Oorwegings (PO's), die belangrikste oorwegings wat met die ontwerp van 'n aansporingsplan in aggeneem moet word, deur middle van 'n stelselmatige en gestruktureerde identifiseringsproses. Die dertien PO's is 'n unieke samesmelting van invloedryke navorsingsstukke van verskeie dissiplines wat met aansporing en motivering te make het.

Die tweede fase gaan dan verder aan, met die gebruik van die dertien PO's as basis, na die ontwerp van 'n BOS. Die BOS neem die vorm van 'n kennisgedrewe persoonlike besluitnemingsondersteuningstelsel wat in 'n raadgewende hoedanigheid optree en uit 'n kennisbasis, modelbasis en gebruikerskoppelvlak bestaan. Die BOS kan gebruik word om gebruike aangaande werknemeraansporings te evalueer en te verbeter. Besluitneming word in terme van beide kwaliteit en spoed verbeter.

Die gebruik van die BOS word deur 'n reeks hipotetiese illustrerende gevallestudies gedemonstreer en ekstern gevalideer deur onderhoude met deskundiges.

Op 'n hoë vlak vermeerder hierdie navorsing die relevansie en bruikbaarheid van bestaande kennis deur bestaande insigte en inligting te analiseer, en dit tot 'n vorm wat meer bevorderlik vir besluitneming is, te struktureer.

ABSTRACT

One of the key challenges organisations face is how to enhance the level of performance of their employees. This research focuses on how incentive practices can be used to stimulate employee motivation. While there are various useful models that can be consulted with regards to the development of an incentive plan, the models do not address incentive plan design considerations in sufficient detail.

Recognising that the performance of organisations is adversely affected by employees who are not appropriately incentivised, and that existing research is extensive yet difficult to utilise, this research contemplated how organisations can utilise the existing literature to enhance organisational performance. This challenge is addressed through the development of a Decision Support System (DSS) that can be used to improve an organisation's employee incentive practices. The research takes a systems engineering approach, with problem-solving at its core and with pragmatism as its main philosophical perspective, and draws from a variety of disciplines to solve problems whose solutions are beyond the scope of a single discipline.

The research is divided into two main phases: A structured literature review, and the development of a DSS. While the findings from the structured literature review and the developed DSS are rigorous and detailed, it must be noted that the answer to the research question lies in the processes and underlying framework that the research designed. Prospective development in the theoretical landscape behind employee motivation and incentives hence poses no problem; the structured literature review can be repeated at any time to reflect this, and the DSS is able to be amended to incorporate any changes in the findings.

The first phase of this research identifies thirteen Primary Incentive plan design Considerations (PICs), the most important considerations that must be taken into account in the design or development of an incentive plan, through a systematic and structured identification process. The thirteen PICs are a unique amalgamation from influential research papers that deal with incentives and motivation from various disciplines.

The second phase continues by using the thirteen PICs as the basis, towards the design of a DSS. The DSS is in the form of a knowledge-driven personal decision support system that acts in an advisory capacity and is composed of a knowledge base, model base, and user interface. The DSS can be used to evaluate and improve practices regarding employee incentives. Decision-making is improved both in terms of quality and speed.

The use of the DSS is demonstrated through a series of hypothetical illustrative case studies and validated externally by means of interviews with experts.

On a high level this research increases the relevance and usability of existing knowledge by analysing existing insights and information, and structuring them into a form that is more conducive to decision-making.

ACKNOWLEDGEMENTS

No strenuous task is undertaken without sufficient motivation. I have learnt that motivation is a complex subject. Understanding incentives and motivation is not enough to automatically become motivated. Furthermore, albeit an unpopular sentiment, motivation without opportunity is of little use. My motivation and opportunities have been influenced in some way by various people. This research has also benefited from the assistance and contributions of certain individuals. The following people deserve more than a mention here on page iv of this document:

- At Stellenbosch University – Aside from motivation and support, some individuals deserve credit for providing invaluable insights and sharpening my thoughts.
  - **Prof Cornè Schutte**, my promotor – From our first conversation in his old office while I was contemplating starting this journey, to discussing what the colour on the final printout looks like, his encouragement, support, and guidance never faltered.
  - **Denzil Kennon**, my colleague and friend – His support and belief always spurred me on. His interest and keen intellect had a significant influence on the quality of my work.
  - Fellow PhD students, specifically **Dr Gerard Ungerer** and **Dr Henno Gous** – Without their camaraderie this undertaking would have been less enjoyable; without their keen minds it would have been more difficult.
  - **Prof Eric Lutters** (from the University of Twente) – He read my dissertation (the entire first lengthier version), really understood it, and helped to mature my perspectives.
  - All other staff at the Department of Industrial Engineering at Stellenbosch University who supported and encouraged me in some way.

- **Pa en Ma** – Praat van motivering en geleenthede; ek gaan nie eers probeer om hier te beskryf hoe baie julle vir my beteken en op soveel vlakke vir my gedoen het nie.

- My oupas en oumas, wat al lank by ons Vader in die hemel is, maar wie ek geseën was om almal goed te ken – Met sulke rigtingaanwysers is dit moeilik om te verdwaal.

- Familie en Vriende – Dolf, Jannie, en Marti. Verder noem ek nie name nie want daar is teveel van julle. Sonder die vriendskap, avonture, en ondersteuning sou en wou ek dit nie maak nie.

- **Henriëtte** – Die laaste bladsye van hierdie hoofstuk het makliker saam met jou geblaai; die volgende pak ek met plesier saam met jou aan.

- **My Heavenly Father** – The Fount of every blessing!

TABLE OF CONTENTS

LIST OF FIGURES

LIST OF TABLES

GLOSSARY

The abbreviations are defined the first time they are used in every chapter and primary subsection. This is with the exception of 'PIC' and 'DSS'.

The four sets of nodes:

- **EJD** Elements of Job Design
- **FIMs** Features of Incentive Mechanisms
- **IMs** Incentive Mechanisms
- **PICs** Primary Incentive plan design Considerations

The Artefact and its main components:

- **DSS** Decision Support System
- **KB** Knowledge Base
- **MB** Model Base
- **UI** User Interface

The User Interface constructs:

- **CEM** Cascading Effects Models
- **ILM** Integrated Links Model

The Various Link Models:

- **PIC↔PIC Links** / **Link Model PIC↔PIC** Links between the PICs themselves
- **IM→PIC Links** / **Link Model IM→PIC** Links between the PICs and IMs
- **IM–FIM Links** / **Link Model IM–FIM** Links between the IMs and FIMs
- **FIM→PIC Links** / **Link Model FIM→PIC** Links between the PICs and FIMs
- **EJD→IM Links** / **Link Model EJD→IM** Links between the IMs and EJD
- **EJD→PIC Links** / **Link Model EJD→PIC** Links between the PICs and EJD

Miscellaneous:

- **DB** Discretionary Behaviour
- **HICS** Hypothetical Illustrative Case Study/Studies
- **IWs** Influential Works
- **KIWs** Key Influential Works
- **OFIs** Opportunities for Improvement
- **PITs** Professionals in Training
- **WoS** Web of Science

SECTION A: SETTING THE SCENE

Chapter 1 through to Chapter 4 introduce the reader to the research's domain. The necessary background is given to introduce the problem statement and specify the solution objectives. This includes a discussion of the research methodology and philosophical perspectives, the presentation of the problem statement, necessary background theory, and an overview of Decision Support Systems.

SECTION A proceeds as follows:

- Chapter 1 provides the **Research Overview**:
    - Chapter 1.2 serves as **Orientation** (background, overview, focus, document structure).
    - Chapter 1.3 describes the **Research Methodology** (perspectives and design).
    - Chapter 1.4 outlines the **Problem Statement**.
- Chapter 2 provides the **Theoretical Background**.
- Chapter 3 introduces the **Decision Support System** concept.
- Chapter 4 finalises the **Solution Objectives**.

Chapter 1: Research Overview

"It's not that I'm so smart,

it's just that I stay with problems longer."

-Albert Einstein

1.1) Introduction

This subsection introduces Chapter 1: Research Overview.

Chapter 1 provides the reader with an overview of the research. This includes introducing the research domain and problem statement, discussing the research perspectives and design, as well as outlining how the document proceeds. This chapter is structured as follows:

- Chapter 1.1) Introduction
- Chapter 1.2) Orientation
  - The background, research overview, research focus, and document structure is provided.
- Chapter 1.3) Research Methodology
  - Philosophical perspective are discussed before the presentation of the research design.
- Chapter 1.4) Problem Statement
  - The gap in the literature is identified and discussed before the presentation of the problem statement and primary research objective.
- Chapter 1.5) Summary

1.2) Orientation

This subsection is written to orientate readers. Sufficient background information is given to explain what need the research addresses. This is followed by an overview of how the research addresses this need. The research focus (problem statement, primary research question, and primary objective) is then presented. A discussion of the key terms and phrases is provided, alongside a rudimentary value chain, to help users understand the scope and approach of the research. Consequently, this subsection draws from the chapters that follow. This subsection concludes with an overview of the document structure to help users navigate the document.

1.2.1) Background

This subsection provides sufficient background information to explain what need the research addresses.

It is noted by scholars that unmotivated employees hamper companies in areas such as innovation, production, and quality (Harell & Daim, 2010), while motivated and engaged employees are more productive, more profitable, more customer-focused, safer, and less likely to leave the organisation (Harter, Schmidt, Killham, & Asplund, 2009). While managers are responsible for a wide range of strategic decisions it is important to note that "The manager works with a specific resource: man" (Drucker P. F., 1986, p. 276). Managers are accordingly tasked with ensuring their employees are motivated and engaged. Managers are thus faced with the ongoing question posed by two of the most influential authors in the field of incentives, Bengt R. Holmström and Paul Milgrom:

> *"Given a highly incomplete set of performance measures and a highly complex set of potential responses from the agent [employee], how can the agent be motivated to act in the social interest?"*
>
> *- (Holmström & Milgrom, 1991, p. 50)*

This is no simple undertaking; incentives have costs (Elrod, Bande, & Murray, 2013). Contracts offering incentives can give rise to dysfunctional behavioural responses where employees emphasise only those aspects of performance that are rewarded (Prendergast, 1999). In addition to this, extrinsic incentives can have a negative effect on Intrinsic Motivation, a "crowding-out" effect (Gagne & Deci, 2005). Alfie Kohn, described at one point as America's most biting critic of money as motivator (Colvin, 1998), asserts that "incentive strategies must fail" because of "the inadequacy of the psychological assumptions that ground all such plans" (Kohn, 1993a, p. 54). The challenges and negative effects are substantial enough for Kohn to posit that:

> *Incentive practices often cause more harm than good and should be done away with completely.*
>
> *- (Kohn, 1993a)*

While there is a consensus that there are many considerations that have to be made when incentives are implemented, and that incentives often have negative effects, most authors do not extrapolate to Kohn's extreme degree. Examples of works containing empirical studies or surmising empirical studies proving that agents do indeed respond to incentives include those of Lazear (2000), Bandiera, Barankay, and Rasul (2005), Prendergast (1999), Groves, Hong, McMillan, and Naughton (1994), and Siemsen, Balasubramanian, and Roth (2007). Since the responsiveness of ordinary citizens to incentives is demonstrated daily in our economy we should not expect it to be different in the workplace. In response to Kohn, G. Bennett Stewart III criticises Kohn's writings as tending to a communistic view that simply does not work and suggests that Winston Churchill's apt aphorism is the best response: "The virtue of communism is the equal sharing of its misery, and the vice of capitalism is the unequal sharing of its blessings" (Stewart, et al., 1993, p. 38). It seems that, on balance, there would be a consensus that:

Summarily doing away with incentives will lead to a loss of individual motivation and a lack of organisational innovation that characterizes companies and societies without extrinsic incentives.

On a certain level one's perspective concerning human motivation, and whether extrinsic incentives should be used is irrelevant. Research should certainly continue to seek answers to these questions, and organisations' modus operandi should be informed by this research. The reality however, is that at this time incentive practices cannot be ignored as:

"Despite concerns and arguments against the use of incentives, most organisations use it in some form."
- (Rynes, Gerhart, & Parks, 2005, p. 581)

"This use appears to be growing, rather than declining."
- (Heneman, 2002; Intellective Group, 2016; WorldatWork, 2015, p. 6)

There is a tendency in behavioural science to be overly critical of the links between performance and rewards, and a tendency in disciplines such as economics and finance to do the opposite. Welch (2003) asserts that this is unfortunate as performance evaluation and pay-for-performance are two of the most powerful tools in an organisation's motivational arsenal. Other authors argue that incentives and Intrinsic Motivation are not necessarily antagonistic, depending on the type of performance and the contingency of the incentive (Cerasoli, Nicklin, & Ford, 2014). When the danger and challenges involved with incentive practices are considered alongside the potential or power of incentives it is aptly concluded that:

"The bottom line is simple: reward plans work when properly designed and supported; there can be something in it for everyone."
- (Stewart, et al., 1993, p. 42)

The phrase 'properly designed and supported' is vital. This research focuses on the design side of the challenge. It is important that research and development is done to ensure that existing knowledge can be utilised to design, evaluate, or improve organisations' incentive practices.

1.2.2) Research Overview

This subsection provides an overview of how the research addresses the need identified above.

Keeping in mind the need for incentive practices to be properly designed, this research set out to determine how the status quo of the literature could be improved. Preliminary literature reviews revealed that the literature on incentives and motivation is extensive and integrates knowledge from a variety of disciplines (see Chapter 2.2 for details). It became clear that there is much ambiguity as to what the most important considerations regarding incentives and employee motivation might be (see Chapter 1.4). As a result it is hard for managers or stakeholders who are not experts in the area of incentives and motivation to consult the literature when guidance is desired. This led to the first of the two major phases of this research; a structured literature review to identify the most important considerations that need to be taken into account when incentive practices are considered. The second phase involved the construction of an artefact that could be used to understand and implement the knowledge generated in the first phase.

Phase 1: The Structured Literature Review → The 13 PICs

Phase 1 identified the most important considerations that need to be taken into account when incentive practices are designed or evaluated. These Primary Incentive plan design Considerations (PICs) are identified through a structured process in the form of a systematic literature review. Details can be found in:

- Chapter 2.3 – Overview of the Structured Literature Review Findings.
- Chapter 5 – PICs According to a Structured Literature Review.
- The EMJ article – Primary Incentive Plan Design Considerations According to a Review of Key Influential Works (Loots & Schutte, 2016).

Phase 2: The Development of an Artefact → The DSS

Phase 2 is the development of an artefact that can be used to understand and utilise the findings of Phase 1. The most suitable vehicle was determined to be a Decision Support System (DSS). This was determined in light of the preliminary literature review and the structured literature review. The 13 PICs serve as the core of the Knowledge Base (KB – the first component of the DSS), this KB is further expanded to include the necessary Incentive Mechanisms (IMs) and Elements of Job Design (EJD). The MB was structured into a Model Base (MB – the second component of the DSS), and a rudimentary User Interface (UI – the third and final component of the DSS). Details can be found in:

- Chapter 3 – The Decision Support System (DSS).
- SECTION B – Knowledge Base (KB).
- SECTION C – Model Base (MB).
- SECTION D – User Interface (UI).
- SECTION E – Wrapping Up.

1.2.3) Research Focus

This subsection contains the research focus (problem statement, primary research question, and primary objective). A discussion of the key terms and phrases are provided, alongside a rudimentary value chain, to help users understand the scope and approach of the research.

The research focus reads as follows:

- **Title:**
  Employee *Incentives*[1] *Engineering*[2]: *Towards*[3] a *Decision Support System*[4].

- **Problem Statement:**
  The performance of *organisations*[5] is adversely affected by *employees*[6] who are not appropriately *incentivised*[7].

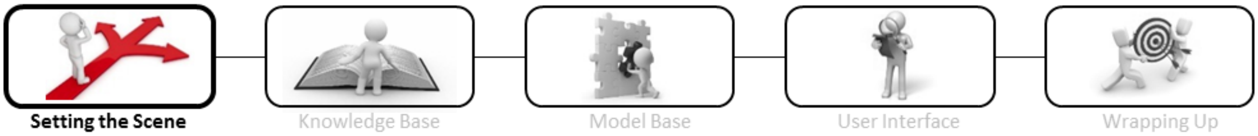
- **Primary Research Question:**
  How can organisations utilise the *literature on incentives, employee motivation, and job design*[8] to enhance organisational performance?

- **Primary Objective:**
  Develop a Decision Support System that can be used to *improve*[9] an organisation's employee incentives *practices*[10].

The terms and phrases numbered 1-10 in the statements above are discussed in Chapter 1.2.3.2, below the rudimentary value chain.

1.2.3.1) Rudimentary Value Chain

The statements above can be better understood in light of the research's value proposition (the philosophical assumptions can be found in Chapter 1.3.1). As an aid to the discussion that follows the overall process or value chain is illustrated in Figure 1-1:



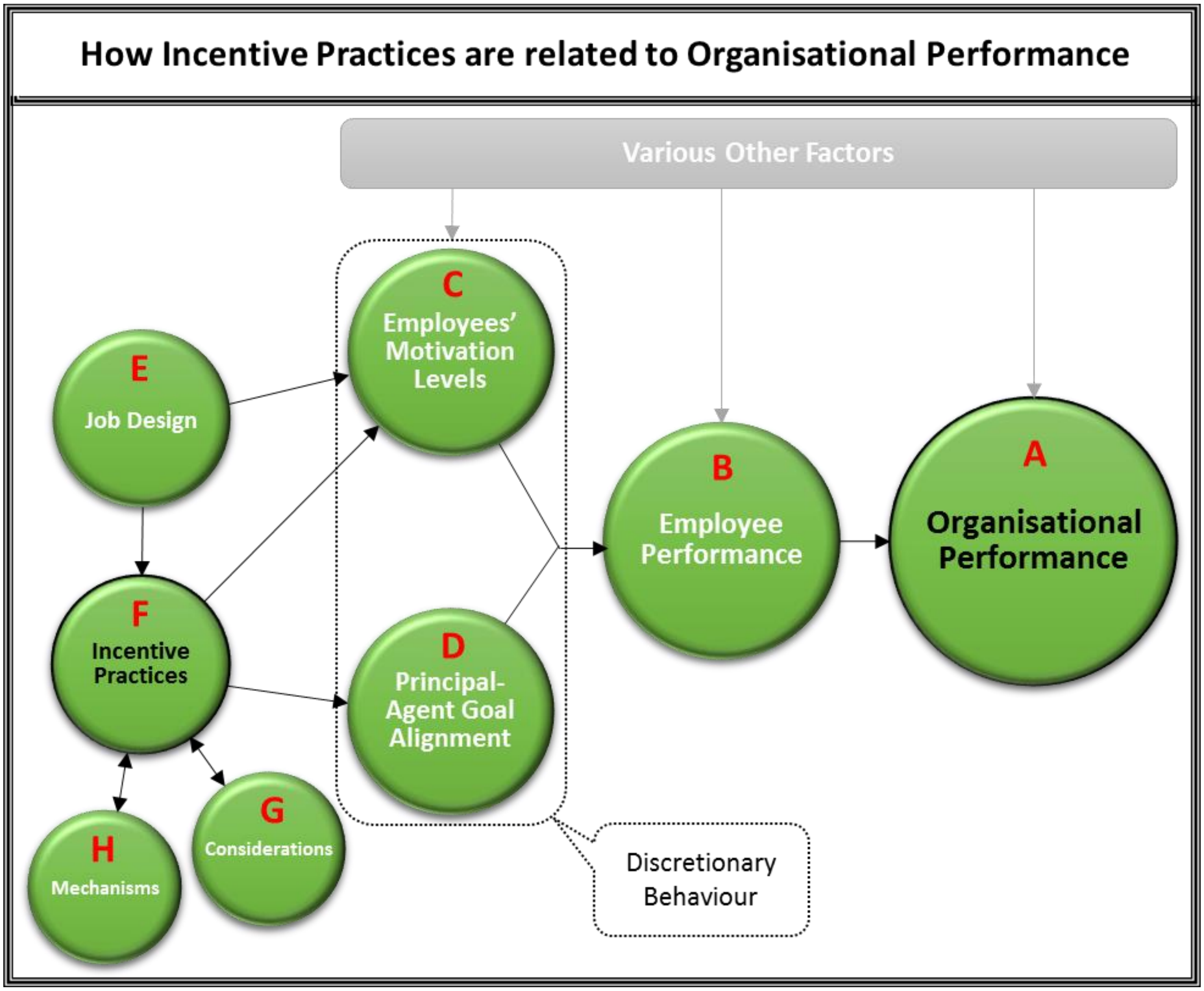


Figure 1-1: How incentive practices are related to an organisation's overall performance

Note that this chapter draws from the literature review that can be found in Chapter 2. An organisation is a system composed of interrelated subsystems. These systems include employees. Overall organisational performance (A) is thus entwined with employee performance (B), both of which are affected by various factors. One of these factors is employees exhibiting Discretionary Behaviour (DB) which is defined in Chapter 2.2.2.1 as "Work related behaviour outside the domain of traditional task statements that promotes the effective functioning of the organisation" (Podsakoff, Whiting, Podsakoff, & Blume, 2009; Hoffman, Blair, Meriac, & Woehr, 2007; Organ, Podsakoff, & MacKenzie, 2006). Two separate yet intricately intertwined facets of DB must be noted:

1) The first facet is the employees' level of motivation (C). This is the fuel that drives employees to go outside or beyond what is traditionally expected or strictly required.
2) The second facet is goal alignment (D). Having a motivated employee is not sufficient; if the goals of the employee are not aligned with that of the organisation the employee's high level of motivation will be wasted and can even harm the organisation. Without goal alignment the motivated employee will not necessarily exhibit behaviour "that promotes the effective functioning of the organisation".

Modelling overall organisational performance (A) as influenced by DB, which is the combination of employees' motivation levels (C) and goal alignment (D), through employee performance (B) is in line with the classic principal-agent problem: "Given a highly incomplete set of performance measures and a highly complex set of potential responses from the agent, how can the agent be motivated to act in the social interest?" (Holmström & Milgrom, 1991, p. 50). Note that the authors are not only concerned with "how can the agent be motivated", they consider motivation that drives the agent/employee to "act in the social interest". An arrow that is not on target is useless regardless of its velocity; a highly motivated employee is not effective, and even potentially harmful, if not motivated to do the right things. Incentive practices (F) can be used to influence employees' motivation levels, and to adjust employees' goals. There are various Incentive Mechanisms (H) and considerations (G) that are part and parcel of incentive practices (F); "the range of instruments that can be used to control an agent's performance in one activity is much wider than just deciding how to pay for performance. One can also shift ownership of related assets, vary restrictions on the ways a job can be done, vary limits and incentives for competing activities, group related tasks into a single job, and so on" (Holmström & Milgrom, 1991, p. 47)**.** When incentives are studied it becomes clear that Job Design (E) must be considered alongside incentives. Job design (E) is not an Incentive Mechanisms by definition, but rather a tool that can be used to improve the use of incentives, and to influence employee motivation; "To Design work without carefully considering the changes that will be in the reward system is likely to lead to inappropriate choices. At the same time, implementing reward systems while taking the design of the task as given will miss important opportunities to enhance performance by altering work designs" (Wageman & Baker, 1997, p. 157).

1.2.3.2) Research Focus in Depth: Key Terms

This subsection discusses why certain key terms were selected and defines them where necessary. This provides further insights into the approach and scope of the research. The numbers below reference the numbers assigned to terms or phrases in the statements at the start of Chapter 1.2.3.

1: 'Incentives'

This research is specifically interested in incentive practices and employee motivation. As a basic concept an incentive can be defined, as in the Oxford Dictionary, as:

"A thing that motivates or encourages someone to do something".

In the context of this research a helpful synonym for 'incentive' can be 'motivator' which is defined in the Oxford Dictionary, as:

"Something that provides a reason or stimulus to do something".

It is important to note that this 'thing' is not necessarily tangible or extrinsic. With this basic concept in mind, it must be noted that incentive plans consider both an employee's motivation levels (C), and goal alignment (D). In this regard see also point 7 and point 10 below. Refer to Chapter 2.2.3 for more background concerning 'Incentives', and see Chapter 6.2.1 regarding Incentive Mechanisms (IMs).

2: ‘Engineering’ – A Systems Engineering Approach

This research takes an engineering approach, specifically a systems engineering approach. The term ‘systems engineering’ is unsurprisingly ambiguous. I posit that ‘engineering’ has ‘problem-solving’ at its core. As surmised by Fraser & Gosavi (2010, p. 3) the word ‘system’ "is a caution against sub-optimization of the larger system through optimization of a subsystem." It is meant to remind one of the three key points which industrial engineering emphasises more than other engineering discipline:

- “Components (including machines and people) interact with each other to create the overall behaviour of the system.”
- “The system being studied is always a subsystem of a larger system and these interactions must also be considered.”
- “Systems include humans.”

See the second half of Chapter 1.3.3.2 for more details.

3: ‘Towards’

This research designs the processes and underlying framework that are required to develop a DSS in this domain. While this research delivers a functional DSS, the DSS is not mature. The Knowledge Base (KB) and Model Base (MB) are well developed, the User Interface (UI) is however rudimentary. This research develops the UI to such a degree that the DSS’s use can be demonstrated, but not to such a degree that the DSS is ready for commercial use.

4: ‘Decision Support System’

This research culminates in an artefact. This artefact is in the form of a system, a Decision Support System (DSS). Other forms that the artefact might have taken include a framework, roadmap, toolkit, or set of guidelines or principles. A DSS provides “knowledge and/or knowledge-processing capabilities that is instrumental in making decisions or making sense of decision situations” (Holsapple, 2008b, p. 163). It is important to note that the DSS does not make decisions, but supports users with decision-making. See Chapter 3 for details.

5: ‘Organisations’

The term ‘Organisations’ helps to define the domain or field that this research is to be applied to. It aligns with the ‘Systems Engineering Approach’ that the research takes. It has, seemingly accurately, been remarked that “We all know intuitively what organizations are, but when pressed to specify the defining elements, it probably doesn’t take long for most of us to realize that this is much more difficult to do than one would think at first blush” (Harper, 2015, p. 14). The difficulty in defining organisations is a result of the vast differences between what we classify as organisations; from a small-scale two-person undertaking to gigantic multinational corporations. This research built an artefact that is based on principles, rather than rules attuned to specific settings. It was thus not necessary to restrict the definition of what an organisation is. Hence, and in line with the systems engineering approach that is followed, the definition and conceptualisation provided by Kendall & Kendall is sufficient:

"Organizations are large systems composed of interrelated subsystems" and "Organizations and their members are usefully conceptualized as systems designed to accomplish predetermined goals and objectives through people and other resources that they employ".

- (Kendall & Kendall, 2010, p. 23)

Note that the domain is thus not restricted to organisations with specific sizes, goals, role distinctions, authority systems, organisational structures or hierarchies, or manufacturing or service categories. The focus is rather on the organisation as a system comprised out of various subsystems which include employees.

6: 'Employees'

It had to be determined whether the research should focus on employees in general, or on a specific type of employee such as frontline employees, frontline managers, middle management, or upper management. Since the variability and complexity in the system does not allow a prescriptive model, an artefact was developed that serves as an aid when making decisions. The model was built on principles rather than specifics. Since the model is principle-driven it was not necessary to limit the model to one specific type of employee. Furthermore the tasks and characteristics of employees overlap to such a degree that a model has to provide for most variables in any case. It follows that the complexity and information required to build the model would not have decreased substantially if a specific type of employee was focused on, yet the usefulness of the model increases substantially if it is not limited to only one type of employee.

7: 'Incentivised' (Note context: '...who are not appropriately incentivised')

This research focuses on incentive practices in organisations; not on employee motivation exclusively or comprehensively. One of the primary focuses of incentive practices (E), as shown in Figure 1-1, is raising employees' motivation levels (C), the other is aligning employees' goals with that of the organisation (D). Some incentives may have no effect on employee motivation levels, yet still improve overall organisation performance by utilising the existing effort levels more efficiently through improved goal alignment. Motivation still has to be considered in great detail so that the links between motivation and incentives can be ascertained; various aspects of employee motivation can be affected through incentives and Job Design.

8: 'Literature on Incentives, Employee Motivation, and Job Design'

The research goes beyond simple incentives or performance-related pay schemes. In order to build a functional model that is grounded in theory and practice all the elements, considerations, mechanisms, and knowledge that are linked to incentives had to be considered. The literature that was studied included:

- Incentives (Both mechanisms and considerations, specifically in a Principle-Agent setting)
- Motivation (Both extrinsic and intrinsic, specifically for employees)
- Job Design

This is depicted in Figure 1-1 C, D, E, F, G, and H. Literature that contributes to this domain includes areas and topics such as; Principal-Agent Theory, Moral Hazard, Self-Determination Theory, Theory of the Firm, Risk Aversion, Performance Measurement, Behavioural Science, Compensation, Tournament Theory, Recognition, Social Loafing, Career Concerns, Selection Effects, Multitasking, and Team Production. This literature interacts with various domains. Refer to Chapter 1.3.3.1 for a further discussion on multidomain research.

9: 'Improve'

The artefact, the DSS, does not improve the situation directly; rather it can be used to improve the situation by improving decision-making with regards to incentive practices. The improved decision-making, resulting from the use of the DSS, is useful when incentive practices are to be 'improved', 'evaluated', or 'established'. The guidance is generic, it is not context specific, as it is based on principles.

10: 'Practices'

The term 'practices' is inserted as the research is not only concerned with specified or formal plans or schemes, but with any and all practices related to how an organisation incentivises or motivates its employees.

1.2.4) Document Structure

This subsection provides an overview of the document structure to help users navigate the document.

This document is structured around the three basic components of a DSS:

- The Knowledge Base (KB) – SECTION B
- The Model Base (MB) – SECTION C
- The User Interface (MB) – SECTION D

This is preceded by an expansive introductory section (SECTION A), and followed by the demonstration, verification, validation, and conclusion section (SECTION E). This is illustrated and discussed further in Figure 1-3.

Each section is made up of various chapters. Each chapter starts with an introduction that includes an overview of the structure of the chapter. The primary subsections are listed and described. Each of these primary subsections begins on a new page.

Document navigation is assisted with a simplified illustration of Figure 1-3 as shown in Figure 1-2. Figure 1-2 is displayed in the header of the document's body, with the relevant section highlighted, as can be seen at the top of this page.

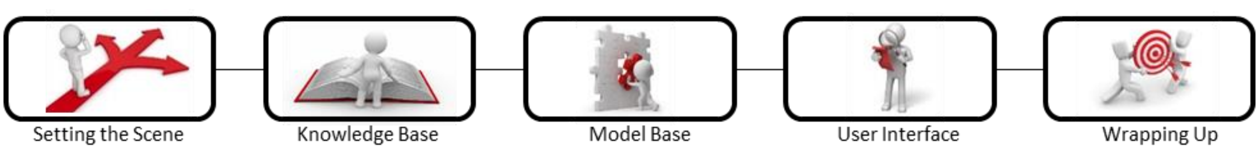
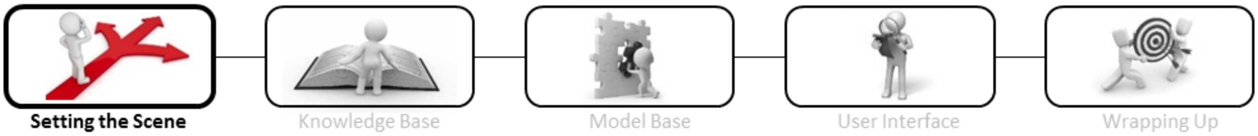


Figure 1-2: A simplified illustration of the document's structure to assist with navigation



An Overview of the Structure of the Document	
	**SECTION A: Setting the Scene** The necessary background is given to introduce the problem statement and specify the solution objectives. This includes a discussion of the research methodology and philosophical perspectives, the presentation of the problem statement, necessary background theory, and an overview of decision support systems.
	**SECTION B: Knowledge Base (KB)** The core components of the KB are identified. The Primary Incentive plan design Considerations (PICs) are identified through an extensive systematic literature review. The typical Incentive Mechanisms (IMs) and Elements of Job Design (EJD) are also identified and described.
	**SECTION C: Model Base (MB)** Basic models are constructed that the DSS uses to help users make use of the information in the Knowledge Base (KB). The links between the PICs themselves, between the PICs and Incentive Mechanisms (IMs), between the PICs and Elements of Job Design (EJD), and between the IMs and EJD are identified. Six sets of links are identified and converted into six Link Models.
	**SECTION D: User Interface (UI)** An Integrated Links Model (ILM) and Cascading Effects Models (CEMs) are provided to complement the existing models in the Model Base (MB), and opportunities for further development are discussed. These models and visuals help users to interact with the MB and Knowledge Base (KB) in a more efficient manner.
	**SECTION E: Wrapping UP** The use of the rudimentary DSS is demonstrated. This is followed by a verification and validation chapter, before closing with the conclusion chapter.

Figure 1-3: An overview of the structure of the document

1.3) Research Methodology

This subsection specifies and describes the research paradigms that are adopted in this study. This is followed by a specification of the appropriate research methods and the research design. Additional perspectives are discussed that shape the outlook adopted by this research: this includes multidomain research, engineering and specifically systems engineering, and the research as a knowledge exercise.

1.3.1) Philosophical Perspectives

This subsection provides a specification and description of the research paradigms that are adopted in this study.

"Research and experimental development comprise creative and systematic work undertaken in order to increase the stock of knowledge and to devise new applications of available knowledge" (OECD, 2015, p. 44). This relies on a systematic research process that consists of collecting, analysing and interpreting information in order to increase our understanding of a phenomenon (Olivier, 2004). It should be noted that all research is based on assumptions about how the world is perceived and how we can best come to understand it (Trochim, 2006). This is determined by the philosophical perspectives or research paradigms that the research follows. It is important to know what these assumptions are in order to conduct research in a responsible way (Leedy & Ormrod, 2001).

Goles and Hirschheim (2000, p. 250) assert that researchers must come to grips with the "essential problem in science", namely "how do we know what we know?", and following on from that, "how do we acquire knowledge?" They go on to note that not only has this age-old problem been at the core of science since its inception, but the solution is arguably as contentious now as it has been for centuries. This research did not attempt to alleviate any philosophical tension, but adopted a research paradigm that is consistent with the problem statement. Unsurprisingly, the adopted research paradigm, 'pragmatism', has been said to take a middle or dual position between positivist and interpretivist ontologies (Goldkuhl G. , 2012, p. 141). This is not a concern, but a deliberate position taken by this research. Numerous theorists and researchers acknowledge the various strengths and weaknesses in both positivist and antipositivist positions, and point out that the conflicting paradigms have achieved a status of coexistence in spite of the best efforts of their most ardent supporters (Tashakkori & Teddlie, 1998). This assertion is compellingly supported by Datta's (1994) five arguments:

- Both paradigms have been in use for a number of years.
- There are a considerable (and growing) number of scholars arguing for the use of multiple paradigms and methods.
- Funding agencies support research in both paradigms.
- Both paradigms have had an influence on various policies.
- Much has been learned via each paradigm.

1.3.1.1) Overview of Research Paradigms

The three major research paradigms are often articulated as the positivist perspective, the interpretivist perspective, and the critical perspective (McCutcheon & Jung, 1990; Orlikowski & Baroudi, 1991; Myers & Avison, 2002; Mingers, 2001). Pragmatism, "a research paradigm that is concerned with knowledge for action and change" (Goldkuhl G. , 2012, p. 92), is also considered. These four research paradigms are differentiated as follows:

- Positivism: "Positivist studies are premised on the existence of a priori fixed relationships within phenomena" (Orlikowski & Baroudi, 1991, p. 5). Reality exists external to the researcher, it is objective and testable and can be measured through observation (Gray, 2014, p. 21).
- Interpretivism: "Interpretive studies assume that people create and associate their own subjective and intersubjective meanings as they interact with the world around them" (Orlikowski & Baroudi, 1991, p. 5). As opposed to positivism (independent observer) the observer is a party to what is being observed, and reality (external and objective with positivism) is socially constructed and subjective (Gray, 2014, p. 25).
- Critical research: Critical research takes a similar view on the nature of reality as interpretivism. "A reality is assumed to be apprehendable that was once plastic, but that was, over time, shaped by a congeries of social, political, cultural, economic, ethnic, and gender factors, and then crystallized [sic] (reified) into a series of structures that are now (inappropriately) taken as 'real,' that is, natural and immutable" (Guba & Lincoln, 1994, p. 110).
- Pragmatism: "Pragmatism is a school of thought that considers practical consequences or real effects to be vital components of both meaning and truth" (Hevner, 2007, p. 91). It is a research paradigm "that is concerned with knowledge for action and change" (Goldkuhl G. , 2012, p. 92).

The underlying philosophical assumptions of each research paradigm in terms of ontology (the nature of reality/'what is'), epistemology (the nature of knowledge/'what it means to know'), methodology (how knowledge is obtained), and axiology (the study of values) is summarised in Table 1-1.

Table 1-1: Research paradigm and philosophical assumption summary (Gray, 2014; Goldkuhl G. , 2011; McCutcheon & Jung, 1990); table adopted from Gous (2014)

		Philosophical Assumptions			
		Ontology	**Epistemology**	**Methodology**	**Axiology**
Research Paradigms	**Positivism**	•Single stable reality •Measurable •Law-like	•Objective •Detached observer	•Experimental •Quantitative •Hypothesis testing	•Truth (objective) •Prediction
	Interpretivism	•Multiple realities •Socially constructed	•Empathetic •Observer subjectivity	•Interactional •Interpretation •Qualitative	•Contextual understand-ding
	Critical	•Socially constructed reality •Discourse •Power	•Suspicious •Political •Observer constructs versions	•Deconstruction •Textual analysis •Discourse analysis	•Inquiry is value bound •Contextual understand-ding •Researcher's values affect the study
	Pragmatism	•Symbolic realism •Meaning linked to practical consequences •Actions and change	•Constructive knowledge •Useful for action and change	•Inquiry •Data through assessment and intervention	•Value determined in terms of usefulness •Value claims tested and proven in practice

1.3.1.2) Positioning

This research adopted pragmatism as its main philosophical perspective. As engineering has problem-solving at its core (see Chapter 1.3.3.2) pragmatism is specifically appealing since it is rooted in problem-solving and "associated with action, intervention and constructive knowledge" (Goldkuhl G. , 2011, p. 135). The underlying philosophical assumptions of pragmatism, as summarised in Table 1-1, is as follows:

- Ontology: "There is an objective reality, existing externally to the individual. However, this reality is grounded in the environment and experience of each individual, and can only be imperfectly understood" (Goles & Hirschheim, 2000, p. 261). "The pragmatist position can be labelled constructive realism or symbolic realism" (Goldkuhl G. , 2011, p. 141).
- Epistemology: Constructive knowledge is emphasised as the role of knowledge is to be useful for action and change (Goldkuhl G. , 2011, p. 142).

- Methodology: "Pragmatism is associated with inquiry as the main type of investigation" (Goldkuhl G. , 2011, p. 142). Data are generated through and used in both assessment and intervention.
- Axiology: Things are "value-neutral in themselves" and "the value of anything is determined solely in terms of its usefulness in achieving some end" (Barger, 2001).

As discussed in Chapter 1.3.1 pragmatism has been said to take a middle or dual position between positivist and interpretivist ontologies. It follows that the process of acquiring knowledge is viewed as a continuum, rather than as two opposing and mutually exclusive poles of objectivity and subjectivity. "This allows the pragmatist to select the approach and methodology most suited to a particular research question, providing a conceptual foundation for the use of both quantitative and qualitative tools" (Goles & Hirschheim, 2000, p. 261).

1.3.2) Research Design

This subsection provides the specification and description of the research methods and the research design.

1.3.2.1) Research Methods and Approach

In pragmatism, knowledge development is conducted through an inquiry process starting with problematic situations, knowledge is developed to better cope with the world (Goldkuhl G. , 2012, p. 92). Having articulated the problem statement, appropriate methods can be selected to address the research objectives. The methods are not limited to purely quantitative or qualitative methods as per the underlying assumptions that flow from pragmatism's ontological stance. It is hence difficult to specify a specific overarching research method. The first phase of the research involves a structured literature review; this phase tends towards the positivist paradigm and is objective (even though source material is a mixture of quantitative and qualitative research). The second phase of the research involves the development of an artefact that is built on the findings of the first phase; this phase tends towards the interpretive or constructivist paradigm. It is thus fair to classify the research as using a mixed methods approach, though not for triangulation purposes, but since different research questions are to be answered in Phase 1 and Phase 2. It is often the case that "a research method appropriate for one question may be inappropriate for another" (Gray, 2014, p. 37).

According to the 2015 version of the Frascati Manual (OECD, 2015, p. 29) research covers three types of activity:

- Basic research: "Experimental or theoretical work undertaken primarily to acquire new knowledge of the underlying foundation of phenomena and observable facts, without any particular application or use in view."
- Applied research: "Original investigation undertaken in order to acquire new knowledge. It is, however, directed primarily towards a specific, practical aim or objective."
- Experimental development: "Systematic work, drawing on knowledge gained from research and practical experience and producing additional knowledge, which is directed to producing new products or processes or to improving existing products or processes."

This research fits into the third type of activity, experimental development. Phase 1, the structured literature review, produces 'additional knowledge' by drawing on the knowledge gained from prior research. As discussed in Chapter 1.3.3.3, the 'additional knowledge' is an extraction and formulation of existing knowledge into a form that is more useful and relevant. Phase 2, the development of the artefact, directs the 'additional knowledge' generated in Phase 1 into a Decision Support System that can improve existing practices. The methodology resonates with action research in terms of contribution to both research and practice (De Villiers, 2005), and with design science research in terms of producing a purposeful artefact that addresses an organisational problem (Hevner, March, Park, & Ram, 2004). Unsurprisingly, pragmatism is suggested as an appropriate research paradigm for both design science research and action research (Goldkuhl G. , 2012).

1.3.2.2) Physical Process

As is native to pragmatism, this research starts with the identification of a problem, and works towards addressing this research problem. Various research activities, including a major deductive-objective-generalising phase and a major constructivist phase that tends to be more inductive, are needed to complete the research. An overview of the various research activities follows:

1) Problem Identification (see Chapter 1.4): This activity involves the identification of the research problem; this involves the motivation and preliminary literature review.
2) Research Objectives and Research Design (see Chapter 1.4.4): The research objectives are inferred from the problem identified in the first activity. The research objectives led to the selection of a Decision Support System (DSS) as the form of the artefact (see Chapter 3). This involves the development of a Knowledge Base (KB), Model Base (MB), and User Interface (UI).
3) Phase 1 – Structured Literature Review (see Chapter 5): A structured literature review was selected as the appropriate research method to construct the Knowledge Base. This activity took a positivist approach, hence a deductive investigation was undertaken in as objective a manner as possible. A systematic approach was required; as researchers can easily be streamlined into certain schools of thought through confirmation bias, and to ensure the extensive amount of information was comprehensively examined. The structured literature review yielded the thirteen PICs (the Primary Incentive plan design Considerations).
4) Phase 2 – Construction of Decision Support System (see SECTION B, C, and D): The Knowledge Base is formulated into various usable models and a User Interface is designed. This activity thus takes an inductive approach. The principles from the structured literature review are formulated and presented in such a way that the resulting artefact can be used to address the research problem.
5) Demonstration, Verification, and Validation (see SECTION E): After verifying that the DSS met the research objectives the use of the DSS was demonstrated. Further validation was done through expert interviews. Note that activities four and five are not perfectly linear. Various iterations, though ad hoc, were required to develop the artefact.

1.3.3) Additional Perspectives

This subsection discusses additional perspectives that shaped the outlook adopted by this research; this includes multidomain research, engineering and specifically systems engineering, and the research as a knowledge exercise.

1.3.3.1) Multidomain Research

The literature on incentives and motivation is extensive and integrates knowledge from a variety of disciplines such as economics, management, organisational theory, psychology, finance, and human resources. Subsequently various domains had to be considered. This was done by means of a purpose designed systematic literature review process. This research would not have been feasible if it were restricted to a single discipline and inadvertently answered and echoes the call for researchers to "throw off their single-paradigm-induced blinders, to adopt a management problem-based (rather than a discipline-based) orientation, and to work toward integration of findings by incorporating in their research designs variables, perspectives, terminologies, and findings from other related research areas. Ours is not the first such call" (Merchant, Van der Stede, & Zheng, 2003, p. 251). The resurgence of interdisciplinary research has occurred "to advance fundamental understanding or to solve problems whose solutions are beyond the scope of a single discipline or area of research practice" (National Academics, 2005, p. 188). Pragmatism is suited to interdisciplinary research; its problem-solving orientation aligns well with interdisciplinary research, and, it provides a conceptual foundation for the use of both quantitative and qualitative tools (Goles & Hirschheim, 2000, p. 261).

1.3.3.2) A Systems Engineering Approach

This research drew from various fields as outlined in Chapter 1.3.3.1 above. Yet the focus of the research was not on these subjects themselves: The knowledge from these fields was merely utilised as part of the analysis, design, planning, management, or optimisation of an integrated system consisting of people, money, equipment, and information to further the effective and efficient production of quality goods or services. This contributes to the success and prosperity of a commercial or organisational undertaking, thereby making a fundamental contribution to the creation of wealth or utility.

Some might find it surprising that Frederick Winslow Taylor, regarded as the first management consultant and father of scientific management, was a mechanical engineer (The Wall Street Journal, 1997). Taylor believed businesses were being run in an inefficient, haphazard way (Taylor, 1911), and developed what he termed 'scientific management' to address this problem in the early 1900s. While modern behavioural scientists critique Taylor's model as being crude and even dehumanising to the worker Peter Drucker reminds us that, "To belittle Taylor because in 1880 he did not know post-Freudian psychology is somewhat like belittling Isaac Newton for not knowing quantum mechanics or non-Euclidian geometry in 1690" (Drucker P. F., 1986, p. 144). What is evident is that the optimisation of systems, even complex systems that include employees, is a problem that has been of interest to engineers for more than a century, if not much longer. This is reflected in modern definitions; "Industrial and systems engineering is concerned with the design, improvement and installation of integrated systems of people, materials, information, equipment and energy. It draws upon specialised knowledge and skill in the mathematical, physical, and social sciences together with the principles and methods of engineering analysis and design, to specify, predict, and evaluate the results to be obtained from such systems" (Institute of Industrial and Systems Engineers, 2016).

Pinning down a definition for 'engineering' itself can be somewhat nebulous. While defining the branch of engineering requires more specifics, the Maori definition is very helpful in a generic sense. When New Zealand was looking for a Maori word for 'engineer', they found that nothing suitable existed in that language. The Institute of Professional Engineers New Zealand (IPENZ) explained the essence of engineering to a Maori commission. The commission suggested a new word, 'wetepanga', for engineering. The word is derived from 'wete' (to solve or unravel) and 'panga' (problem). Professional engineers are thus 'tohunga' (an expert) 'wetapanga': Expert Problem Solvers (Pons, 2010). While engineering can accordingly be said to be 'problem-solving' in essence, the specific approach that this research, or piece of engineering, followed is a systems approach.

The term 'systems engineering' is unsurprisingly ambiguous. Fraser and Gosavi (2010, p. 2) summarises the meanings that people typically have in mind when they refer to 'systems engineering':

1. The International Council on Systems Engineering definition
2. A subfield of electrical engineering
3. A subfield of industrial and systems engineering
4. A subfield of engineering management or technology management
5. The information technology definition
6. Systems engineering based on systems theory

The definition of systems engineering that is applicable in this research is the third one, a subfield of industrial and systems engineering:

"*Often the phrase 'industrial and systems engineering' is used interchangeably with 'industrial engineering.' Industrial engineers create a new system or improve an existing system. The word 'system' is meant to remind the IE of three key points which IEs emphasize [sic] more than other engineering disciplines: (1) components (including machines and people) interact with each other to create the overall behavior [sic] of the system; (2) the system being studied is always a subsystem of a larger system and these interactions must also be considered; and (3) systems include humans. The word 'system' is a caution against suboptimization [sic] of the larger system through optimization [sic] of a subsystem*."

- Fraser and Gosavi (2010, p. 3)

The systems engineering approach aligns with the conceptualisation of organisations as "systems composed of interrelated subsystems". A systems engineering approach is further evident in the construction of the Integrated Links Model (ILM), or system of interconnected nodes and links, that describes the relationships between the PICs, Incentive Mechanisms (IMs), and Elements of Job Design (EJD).

1.3.3.3) The Research as a Knowledge Exercise

The purpose of this research, and artefact, could be described as increasing the usability and relevance of knowledge to users for decision-making purposes. This resonates with pragmatism's epistemology where the role of knowledge is to be useful for action and change (Goldkuhl G. , 2011, p. 142). Consider the progression of the six states of knowledge as identified by van Lohuizen in 1986, which roughly corresponds to Simon's three phases of decision-making (Holsapple, 2008a, p. 40), depicted in Figure 1-4:

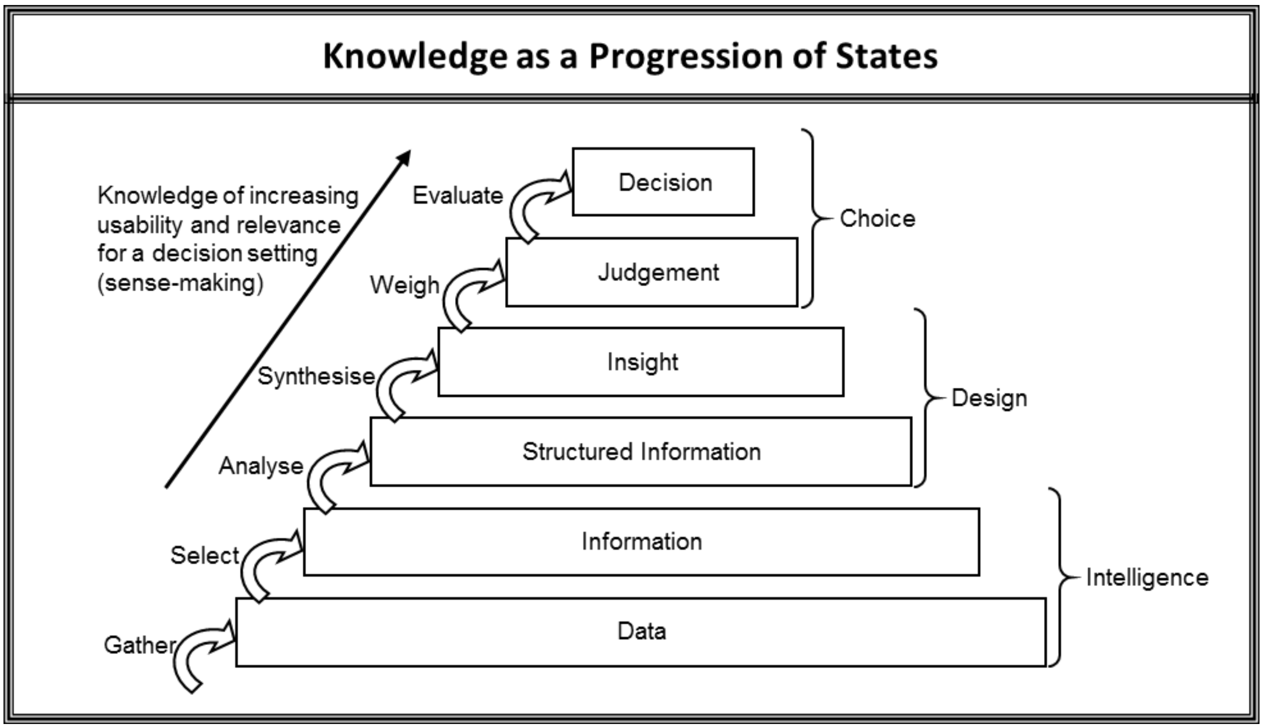


Figure 1-4: Knowledge as a progression of states (Holsapple, 2008a, p. 40) – digitally enhanced

Holsapple (2008a, p. 40) argues that this perspective offers several fundamental notions regardless of the names and number of states. He notes that "these states form a progression from the lowest level, where usability is marginal or potential, to higher levels where usability is clearer and more immediate." It is explained that as we move from lower to higher states of knowledge:

- The relevance of the knowledge increases with respect to accomplishing some objective.
- Possibilities of knowledge overload diminish.
- Knowledge quality tends to increase.

In a sense the purpose of this research is to take existing knowledge and make it more usable and relevant. Data and information available in the literature were gathered and selected, then analysed and structured so that it can be synthesised into insights which users can weigh and apply their judgement to in order to better evaluate decisions. The initial data/information identified in the structured literature review can be thought of as a collection of the structured information and insights of various authors in various domains. In short the artefact improves users' decision-making capabilities with regard to incentive practices by identifying (in the structured literature review) and communication (through the DSS) the appropriate information.

1.4) Problem Statement

This subsection identifies the problem that the research addressed. A gap in the literature, and its implications, are discussed. This leads to the formulation of the problem statement, research question, and primary objective.

As outlined in Chapter 1.2.1 the importance of employee motivation or engagement and the challenges apropos incentive practices highlighted the significance of the question posed by two of the most influential authors in the field of incentives, Holmström & Milgrom (1991, p. 50): "Given a highly incomplete set of performance measures and a highly complex set of potential responses from the agent [employee], how can the agent be motivated to act in the social interest?" Chapter 1.2.1 went on to note that despite concerns most organisations use incentives in some form, and that this use appears to be growing rather than declining. Seeing that this use can be beneficial, but also cause more harm than good by giving rise to dysfunctional behavioural responses, Chapter 1.2.1 concluded that it is imperative that incentive plans are properly designed. This research focuses on the design side of the challenge.

1.4.1) A Gap in the Literature – Existing Tools and Guidelines

This subsection examines existing tools and guidelines, and compares them with the results of the structured literature review.

The literature on incentives and motivation is well-developed. Tools and guidelines have been developed to aid in the implementation or design of an incentive plan. These tools or guidelines, however, do not holistically incorporate the primary considerations that incentive plan designers have to be aware of[1]. This was evident when ten guides or models that were regularly being used were examined:

- The PIBI Model from the IRF (Stolovich, 2010).
- A Toolkit for Designing and Implementing Staff Incentives Schemes from MicroSave (Holtmann & Grammling, 2005).
- Ten Steps to Building an Effective Incentive Plan (The VisionLink Advisory Group, 2009).
- 12.5 Steps to a Perfect Incentive Program from Spear One (May, 2013).
- The Incentive Program (The Incentive Marketing Association, 2015).
- Variable Pay and Choosing the Right Incentive Scheme from 21st Century Pay Solutions Group (Bussin, 2008).
- Key Steps to Designing an Incentive Plan (Horizon, 2013).
- 7 Steps to Effective Incentive Compensation (Triangle Performance, LLC, 2007).
- Merit Pay Planning and Implementation Guide (University of Minnesota, 2013).
- Implementing Total Rewards Strategies from the SHRM Foundation (Heneman R. L., 2007).

[1] The Primary Incentive plan design Considerations (PICs) are identified in the structured literature review in SECTION B. In this subsection the content of tools and guidelines will be compared to the PICs. Initially this would not have been possible; it was initially intuitively observed that the tools and guidelines do not contain sufficient guidance as far as underlying design considerations are concerned. After the PICs were identified they could be compared with the tools and guidelines to determine whether the intuitive observation was accurate. This final comparison is referenced and discussed in this subsection.

In order to analyse these models or guidelines, it was helpful to extract an outline of the process that each of the above models prescribes, an overview of the content of the design or selection step specifically, and a summary of the PICs addressed in any of the other steps. These elements are summarised on Table 1-2 for each of the ten guides/models.

Table 1-2: Implementation guidelines from existing models

	1) Process Outline	**2) Design or selection phase content (relevant step/s underlined in column 1)**	**3) Incentive design considerations addressed (numbers reference column 1)**
PIBI Model	1: Unrealised Work Goals 2: Incentive System Selection/ Design 3: Task Value 4: Efficacy 5: Agency 6: Mood 7: Active Choice/ Persistence/ Mental Effort 8: Performance Improvement	What types of incentive systems are available? How to select best system? How incentive is earned? What kind of incentive? Duration? Cost-Benefit Analysis	2: Perceived Value, Recognition, Cultural Differences 3: Intrinsic Motivation, Purpose 4: Perceived Competence, Team Production 5: Trust 6: Mood
MicroSave	1: Define Objectives 2: Determine staff to target and financial estimate 3: Select Mechanisms 4: Conduct technical design work 5: Analyse costs and benefits 6: Run a pilot test 7: Sell scheme to staff 8: Monitor and adjust as necessary	What needs measuring? Qualitative or Quantitative Individual/ Group Intervals Type Technical considerations and formula	1: Selection Effects 2: Team Production, Selection Effects (Risk) 3: Intrinsic Motivation, Performance Measures, Dysfunctional Responses n/a: Perceived Fairness
VisionLink	1: Define the Purpose 2: Identify the People 3: Quantify the Value 4: Share the Value 5: Standardise the Benefit 6: Establish Tiers 7: Use Weight 8: Define Indicators 9: Determine Your Allocation 10: Prescribe the Measurement	Schedule	10: Measures

	1) Process Outline	2) Design or selection phase content (relevant step/s underlined in column 1)	3) Incentive design considerations addressed (numbers reference column 1)
Spear One	1: Define Goals 2: Understand Target Audience, 3: Analyse Current State 4: Design Program Structure 5: Select Rewards & Recognition 6: Assign Program Administration 7: Add Technology Platform 8: Create Technology Platform 9: Build the Budget 10: Track Achievements 11: Fulfil Rewards 12: Report Results	Program types Duration Audience Select mechanisms Monetary or non-monetary	1: Measures 2: Employee Characteristics 4: Understandable (simplicity) 10: Measures
IMA	1: Establish Objectives 2: Outline Strategy 3: Measure Performance 4: Establish the Budget 5: Budget Elements 6: Select the Perfect Award 7: Administer the Program 8: Celebrate the Success of the Program 9: Analyse the Success of the Program	Speak with employee to select award	2: Team Production 3: Performance Measures
21st CPS	1: Corporate Investigation (and eligibility) 2: Type of Incentives 3: Performance Factors and Individual Awards 4: Administration and Communication 5: Training 6: Implementation and Monitoring	Performance Measures Chose options Feasibility Risks	2: Measurable Parameters 3 : Risks
Horizon	1: Meeting with senior managers 2: Decide on who should be eligible 3: Decide on levels of incentive 4: Design the incentive plan 5: Cost the plan 6: Obtain agreement 7: Communicate	Technical design aspects Schedules Measures Checklist: line of sight, achievable, meaningful rewards, in budget, understand-able	2: Performance Measures 4: Employee tastes
Triangle	1: Determine what the plan intends to accomplish 2: Determine participants 3: Develop clear performance goals 4: Determine logistics 5: Communicate 6: Rinse and Repeat		3: Measurability 5: Understandable (simplicity)
UoM	1: Prepare 2: Design 3: Implement	Determine Goals Model selection Details including timing Admin processes Feedback	1: Team Production

	1) Process Outline	2) Design or selection phase content (relevant step/s underlined in column 1)	3) Incentive design considerations addressed (numbers reference column 1)
SHRM	1: Assessment 2: Design 3: Execution 4: Evaluation	Compensation Benefits Employee Development Work Environment	2: Perceived Fairness, Development Experiences, Job Design, Recognition, Life Balance 3: Measures

As can be seen in the second column of Table 1-2, the design or selection step typically prompts users to ask questions such as "what incentives systems are available?", "how should incentives be selected?" and "what should the duration or schedule be?" Subsequently the guides/models instruct users to complete a cost-benefit analysis, select mechanisms, and determine goals and assist users with the technical design or formula development aspects. The content in the design step does not, however, address primary considerations that should be driving the questions, mechanisms, or formulae highlighted in this step. When the other steps are examined the PICs are still missing (refer to the third column of Table 1-2). While some of the models address a few of the PICs, they do not provide users with a clear overall picture of the most important considerations that need to be kept in mind. Table 1-3 shows what PICs are addressed, to at least some degree, by what models:

Table 1-3: PICs referenced by existing tools and guidelines

	1: Career Concerns	2: Agent's Level of Risk Aversion	3: Job Complexity	4: Performance Measurability	5: Team Production	6: Perceived Fairness	7: Autonomy	8: Perceived Competence	9: Relatedness/ Purpose	10: Risk to Agent	11: Gaming/ Multitasking	12: Intrinsic Motivation	13: Selection Effects	Total
PIBI Model														7
MicroSave														6
VisionLink														1
Spear One														3
IMA														2
21st CPS														2
Horizon														2
Triangle														2
UoM														1
SHRM														4

If all the considerations across the various models are combined, a good portion of the PICs are touched upon, yet none of the models is individually comprehensive enough. The most developed model in terms of PICs considered seems to be the PIBI model, yet it only references seven of the thirteen PICs. The PIBI model is certainly useful, yet "even the PIBI model can leave some doubt as to how to design highly individualized and targeted incentive programs [sic]" (Schweyer, 2011, p. 12).

1.4.2) Implications

This subsection considers the implications that arise as a result of the gap in the literature identified in the previous subsection.

Stakeholders, especially designers or managers who are not necessarily experts in the field, often turn to the available tools and guidelines due to the scope and complexity of the domain and the available literature. The literature on incentives and motivation is extensive and integrates knowledge from a variety of disciplines such as economics, management, organisational theory, psychology, finance, and human resources. In addition to the width and breath of the literature there are different schools of thought that often seem, and sometimes are, contradictory. Different disciplines and schools of thought emphasise different aspects. It is therefore difficult for users who are not experts in the area of incentives and motivation to consult the literature when guidance is desired. While there are various useful models that can be consulted with regards to the development of an incentive plan, the models do not cover the primary considerations in sufficient detail. It is reasonable to postulate that this is a significant factor contributing to the situation where incentive plans often do more harm than good; there is no contention that when incentives are not appropriately applied detrimental effects are common.

People hold many views with regard to how individuals should be motivated. It can be tempting to design an incentive plan with one's own intuition, especially considering the situation as described above. Application is based on a set of decisions made by an incentive plan's designer. "A wealth of research has demonstrated that humans do not always make strategic decisions that are well calculated. Instead, humans have been shown to make decisions based on heuristics, biases and other 'non-rational' or intuitive tendencies" (Starcke & Brand, 2012, p. 1230).

The answer to the question posted by Holmström & Milgrom (1991, p. 50), "Given a highly incomplete set of performance measures and a highly complex set of potential responses from the agent [employee], how can the agent be motivated to act in the social interest?", does not seem to be available in a usable form. The wider literature contains many answers, yet if this knowledge is not useful for actions and change, it does not answer Holmström & Milgrom's question satisfactorily from a pragmatist point of view. Aside from large scale failures such as the 2007-2008 global financial crisis or the recent Wells Fargo scandal (Barro, 2016) other sources suggest Holmström & Milgrom's question is still relevant. According to Gallup (Mann & Harter, 2016) at the start of 2016 only 32% of of U.S. employees were engaged - "The world has an employee engagement crisis, with serious and potentially lasting repercussions for the global economy." WorldatWork's 2015 member survey found that 47% of companies who already have a recognition plan in place are considering implementing new plans in the next 12 months, in 2013 the figure was 44% (WorldatWork, 2015). This can indicate that use is growing, but also that companies have not found an ideal solution as roughly half of the companies introduce new plans each year. Many researchers posit that employee motivation is still one of the biggest problems facing organisations (Cerasoli, Nicklin, & Ford, 2014).

1.4.3) Problem Statement

This subsection presents the problem statement and primary research question.

Having noted the state of employee engagement, research questions like that of Holmström & Milgrom (1991), and the state of existing tools and guidelines developed to aid in the implementation or design of an incentive plan, the problem statement can be formulated as follows:

Problem Statement – The performance of *organisations*[5] is adversely affected by *employees*[6] who are not appropriately *incentivised*[7].

It is observed that, while the theory is certainly not perfect and various tensions exist, practices are often not in line with theory. This is due to a series of challenges such as; the breadth and depth of the literature, the complexity and tension in the literature, and the failure of existing models to communicate the most important design consideration as found in the literature. In light of this and the findings in the structured literature review (see Chapter 5) the primary research question is formulated as follows:

Primary Research Question – How can organisations utilise the *literature on incentives, employee motivation, and job design*[8] to enhance organisational performance?

(The terms and phrases denoted 5-8 in the statements above are discussed in Chapter 1.2.3.2 below the rudimentary value chain.)

1.4.4) Primary Objective – The Need for an Artefact

This subsection presents the primary objective.

In order to answer the research question and address the problem statement it is necessary to alleviate the challenges that give rise to the problem statement. The difficulty stakeholders have with consulting the existing literature can be reduced by improving the quality of the knowledge in the domain (see Chapter 1.3.3.3 for further discussion). This can be done by identifying the most important considerations that stakeholders, such as managers or incentive plan designers, have to be aware of when an incentive plan is designed or evaluated. Not only must the most important considerations be identified, they must also be related to each other and to Incentive Mechanisms specifically. The usefulness or quality of this information or knowledge increases greatly if the information or insights is structured or synthesised in such a manner that stakeholders can use it to make better decisions. Decision-making ability can be improved either by helping users to make better decisions, or by helping users to make the same decision with less time or effort. A Decision Support System (DSS) has been identified as the best vehicle to address these requirements (see Chapter 3 for more details). The first component of the DSS calls for a structured literature review to build the required Knowledge Base. The second and third components of the DSS arranges and communicates this information in such a manner that decision-making is improved. The primary objective can thus be formulated as follows:

Primary Objective – Develop a *Decision Support System*[4] that can be used to *improve*[9] an organisation's employee incentives *practices*[10].

(The terms and phrases denoted 4, 9, and 10 in the statement above are discussed in Chapter 1.2.3.2 below the rudimentary value chain.)

A detailed description of what the DSS encompasses can be found in Chapter 3: this is accompanied by the high-level solution objectives in Chapter 4.

1.5) Summary

This subsection concludes Chapter 1: Research Overview.

It was concluded, after introducing the domain and the challenges surrounding employee motivation and incentives, that this research should focus on helping stakeholders with the design considerations apropos incentive practices. With pragmatism selected as the most appropriate research paradigm, the research design resulted in two phases; a structured literature review and the construction of an artefact. The research can be described as multidomain (or interdisciplinary), takes a systems engineering approach, and ultimately improves the quality of existing knowledge. The concerns that arose from an ad hoc study of the domain were verified by examining existing tools and guidelines. The problem statement was formulated as:

> *"The performance of organisations is adversely affected by employees who are not appropriately incentivised."*

This led, in conjunction with the findings from the structured literature review in Chapter 5, to the formulation of the primary research question as:

> *"How can organisations utilise the literature on incentives, employee motivation, and job design to enhance organisational performance?"*

In light of the problem statement, primary research question, and results from the structured literature review, the primary objective was formulated as:

> *"Develop a Decision Support System that can be used to improve an organisation's employee incentives practices."*

This chapter contains enough information to give the reader a good overview of the research. However, the scene cannot be considered set without the proper theoretical background (Chapter 2), a study of Decision Support Systems (Chapter 3) and a clear formulation of the solution objectives (Chapter 4).

Chapter 2: Theoretical Background

"If we knew what it was we were doing,

it would not be called research, would it?"

-Albert Einstein

2.1) Introduction

This subsection introduces Chapter 2: Theoretical Background.

Chapter 2 gives an overview of the literature required to understand how incentives relate to employee motivation. After noting the importance of employee performance the concept of Discretionary Behaviour is introduced and accompanied by a look at incentives specifically. The information required to formulate the research statements and questions includes insights from the structured literature review. An overview of the findings is thus included in the theoretical background. This chapter is structured as follows:

- Chapter 2.1) Introduction
- Chapter 2.2) Preliminary Literature Review
  - A literature review of incentives preceded by noting the importance of employee performance, and the introduction of the concept of Discretionary Behaviour.
- Chapter 2.3) Overview of the Structured Literature Review Findings
  - An overview of the findings from the structured literature review from Chapter 5.
- Chapter 2.4) Summary

2.2) Preliminary Literature Review

This subsection notes the importance of employee performance, before introducing the concept of Discretionary Behaviour in light of employee engagement and incentives. This is followed by a closer look at incentives specifically.

2.2.1) Employee Performance

This subsection notes the importance of employee performance.

The overarching goal of this research is to optimise the performance of organisations. Recognising the need for continuous improvement must lead to a critical analysis of the process in question. The importance of this mindset is, crudely perhaps but nonetheless compellingly, encapsulated by Jack Welch's well known words:

> *"If you don't have a competitive advantage, don't compete."*
>
> *- Jack Welch*

When organisations are understood to be "composed of interrelated subsystems" which consist of "people and other resources" (Kendall & Kendall, 2010, p. 23) it becomes clear that employee performance is an important factor affecting the overall performance of an organisation. This is further emphasised when a systems engineering approach is adopted (See the closing paragraphs of Chapter 1.3.3.2). The importance of employee performance is not limited to CEO or managerial performance:

> *"An army wins or loses based upon what happens on the front lines. The same is true with an organization. The organization's leaders must maintain constant awareness of the situation and performance of those who serve on the front lines. The importance of the frontlines is absolute. The neglect of the front lines is disastrous."*
>
> *- Unknown Author*

This line of reasoning is supported by research and statistics which continually link high rates of employee engagement with corporate success. In a study of 955,905 employees across 32,394 business/work units Gallup Inc. found that engaged employees are more productive, more profitable, more customer-focused, safer, and less likely to leave the organisation (Harter, Schmidt, Killham, & Asplund, 2009). Gallup Inc. is only one of many advocates for employee engagement; their study is particularly remarkable due to their large data pool. Employee engagement is widely recognised as a key factor in business success by industry and the literature in general. Other examples includes the 2012 Bersin & Associates Research Report which stated that employee engagement is critical (Garr, 2012), and the 2001 Hay Group study which found that offices with engaged employees were as much as 43% more productive (Murlis & Schubert, 2001).

2.2.2) Discretionary Behaviour (DB)

This subsection introduces the concept of Discretionary Behaviour.

Having established the importance of employee performance, the concept of Discretionary Behaviour (DB) is introduced. It will be seen that employee performance is related to employees exhibiting DB.

2.2.2.1) What is Discretionary Behaviour?

Discretionary Behaviour is often referred to as “discretionary work performance” or “Organizational Citizenship Behaviour (OCB)”. Various definitions exist, some claiming that OCB and DB have certain differences. Similar constructs such as Contextual Performance, Prosocial Organisational Behaviour, and Extra-Role Behaviour also exist. There is much overlap and often a sharing of terms (similar to ‘managers’ and ‘supervisors’). As DB will be a key concept in this research some time must be spent to clarify what the reader should understand when reading ‘DB’.

Half a century ago, in 1964, Katz proposed that for organisations to operate successfully their employees must be willing to do more than the minimum formal and specified technical aspects of their jobs (Rioux & Penner, 2001). In 1988 Organ defined DB as “individual behavior that is discretionary, not directly or explicitly recognized by the formal reward system, and that in the aggregate promotes the effective functioning of the organization” (Podsakoff, Whiting, Podsakoff, & Blume, 2009, p. 122). The reader should note that the phrase 'not directly or explicitly recognized by the formal reward system' seems to pose a problem as this research investigates how DB is affected by the use of incentives. Criticism along these lines formed part of the reason that led Organ to redefine DB in 1997 as “performance that supports the social and psychological environment in which task performance takes place” (Podsakoff, Whiting, Podsakoff, & Blume, 2009, p. 122). A definition that is in line with Organ’s revised version is Borman and Motowidlo’s 1993 definition describing DB as something that “shapes the organizational, social, and psychological context that serves as the critical catalyst for task activities and processes” (Borman & Motowidlo, 1993, p. 71). There have since been many definitions of DB or OCB. During a review of OCB literature in 2007 it was described as “work-related behavior outside the domain of traditional task statements and formal organizational reward systems” (Hoffman, Blair, Meriac, & Woehr, 2007, p. 555). This study utilises an amalgamation of Organ’s 1988 definition and the other definitions mentioned above. So that the reader can appreciate the nuances of the definition it is helpful to consider Organ’s 1988 definition in more detail:

- “Discretionary” → As explained by the authors in the 2006 book *'Organizational citizenship behavior: Its nature, antecedents, and consequences',* 'discretionary' refers to specific behaviour in a specific context that is not an absolute requirement of the job description. Rather the behaviour involves some kind of personal choice.
- “… not directly or explicitly recognized by the formal reward system” → The authors go on to explain that this does not mean that no rewards can be given to individuals who exhibit Discretionary Behaviour, but rather that “(T)he important distinction is that such rewards must NOT be contractually guaranteed by any formal policies and procedures, at best probabilistic in

nature, at most an inference on the part of the individual who contemplates such returns, and their attainment must be uncertain in terms of time and manner".

- "in the aggregate promotes the effective functioning of the organization"→ Here the authors explain that actions do not need to have significant effects, but that when considered together, they promote the effective functioning of the organisation.

- (Organ, Podsakoff, & MacKenzie, 2006, p. 122)

The second phrase will be omitted from this study's definition as it introduces unnecessary confusion and was omitted from Organ's 1997 definition. The authors recognise that rewards may exist, only that they must not be guaranteed or explicit for an action to be considered DB. Other authors identify a trend where DB is migrating from discretionary to required (Marinova, Moon, & Van Dyne, 2010).

Considering the focus on organisations, incentives, and employee performance, as well as the above-mentioned definitions of DB, a standardised definition is formulated as shown in Figure 2-1. It is in line with the 1988 and 1997 Organ definition, the 1993 Borman and Motowidlo definition as well as the description given by Hoffman et al. in 2007 which is given above.

Discretionary Behaviour (DB)

↓ ↓ ↓

"Work-related behaviour outside the domain of traditional task statements that promotes the effective functioning of the organisation."

Figure 2-1: Standardised definition for Discretionary Behaviour

As an illustration some examples of DB as listed by Kiker and Motowidlo (1999) are:

- volunteering for extra activities;
- persisting with enthusiasm when needed to complete important job requirements;
- helping and cooperating with others;
- following rules and prescribed procedures even when personally inconvenient;
- openly endorsing, defending, and supporting organisational objectives.

Note that this is for front-line employees specifically; it will be different for other employees.

The above definition of DB harmonises well with Holmström & Milgrom's (1991, p. 50) question: "Given a highly incomplete set of performance measures and a highly complex set of potential responses from the agent, how can the agent be motivated to act in the social interest?" Note that the authors are not only concerned with 'how can the agent be motivated?', they consider motivation that drives the agent/employee to 'act in the social interest'. Similarly the definition of DB encapsulates not only improved levels of performance (behaviour outside or beyond minimum technical requirements), but also behaviour 'that promotes the effective functioning of the organisation'.

2.2.2.2) Discretionary Behaviour is Required

Noting the importance of employee performance (Chapter 2.2.1), it can be inferred that it is important for employees to exhibit DB. This is assuming that employee engagement is closely related to employees exhibiting DB. This assumption seems reasonable when comparing the definition of DB to that of employee engagement. While various definitions for employee engagement can be found, it is typically described as “a high level of employee involvement, commitment to the organization and job satisfaction” (Scott, McMullen, Royal, & Stark, 2010, p. 1). 'A high level of employee involvement' cannot occur when there is no 'work-related behaviour outside the domain of traditional task statements', and 'commitment to the organization' relates to work behaviour that 'promotes the effective functioning of the organisation'.

While employee performance is certainly important for any type of employee, it could be asked whether this holds for DB, especially with front-line employees who typically perform more mundane or simple tasks. In a study on output differences by Job Complexity, the Hay Group found a 19% difference in discretionary performance between great and average workers even in relatively simple jobs (Murlis & Schubert, 2001). This percentage increases with Job Complexity and was found to be as high as 120% in extreme circumstances (Hunter, Schmidt, & Judiesch, 1990). The importance of DB does not only increase with Job Complexity, but also with managerial concerns as you move further up a company’s hierarchy. Whilst discussing front-line managers, Purcell & Hutchinson (2007, p. 6) remarked that “people management roles often rely on the manager’s own sense of motivation and commitment”, it would seem reasonable that they later remarked, (Purcell, Kinnie, Swart, Rayton, & Hutchinson, 2009, p. 64), that people management is “therefore likely to be more discretionary than other aspects of FLM [frontline manager] duties”. Furthermore Stevenson, the Chief Executive at Brava Ltd, writes that, “Triggering discretionary effort in frontline managers [as opposed to non-managerial staff] is even more important, since it impacts on those they manage. Consequently, the way frontline managers are managed by their middle manager, influences their discretionary effort positively or negatively” (Stevenson, 2011). DB is consequently important to all levels of employees, and is perhaps more important as you move up a company’s hierarchy.

2.2.2.3) Can Incentives Stimulate Discretionary Behaviour?

Before exploring the nuances surrounding the relationship between incentives and employee motivation, especially extrinsic and intrinsic motivation, it must be affirmed that incentives can be used to stimulate DB. If this is affirmed, having noted that employee performance is important and related to DB, further research can be justified according the value chain illustrated in Figure 2-2:

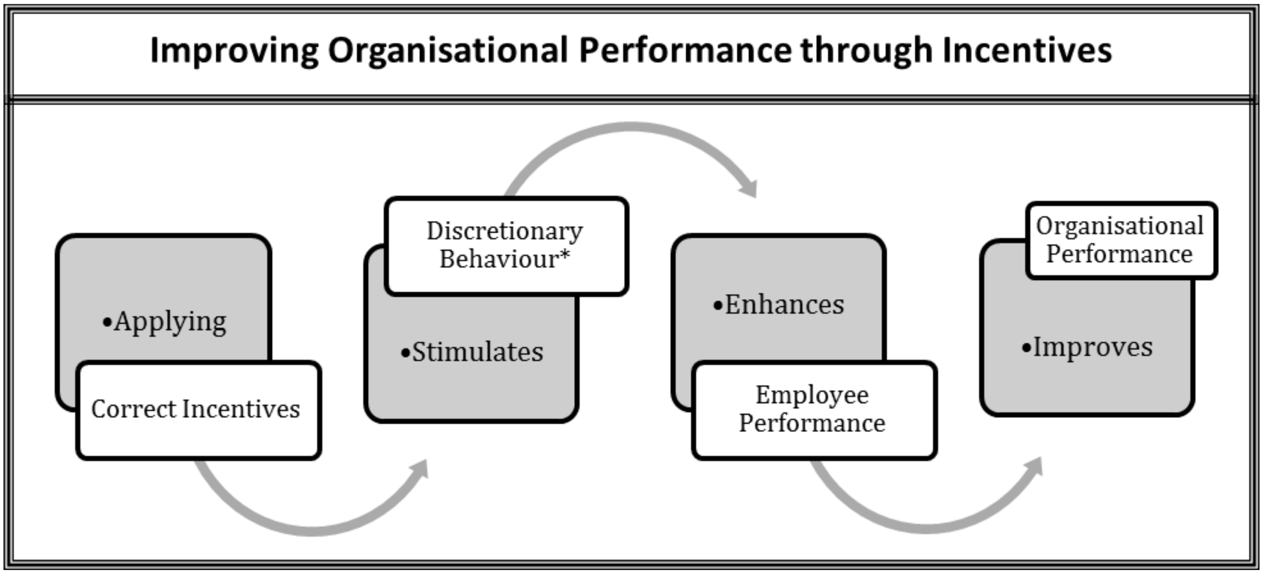


Figure 2-2: Improving organisational performance through incentives

*As per the definition provided for DB it is only positive. Behaviour that is discretionary but not positive can also occur and must be avoided.

It does not have to be argued that DB cannot occur without incentives, simply that DB can be improved or stimulated by incentives. As many definitions, especially older definitions, define DB as something that is not done for incentives, the literature does not contain many examples of how incentives stimulate DB. There have, however, been numerous studies showing that people who exhibit higher levels of DB receive more rewards. This correlation implies that rewards can be used to stimulate higher levels of DB. Noting the definition of DB and OCB, some findings supporting the link between DB and incentives are listed below:

- In a 2006 paper Tammy Allen, the current President of the Society of Industrial and Organisational Psychology, confirms that organisational rewards are linked to engaging in OCB (Allen, 2006).
- In another 2006 study Salamon and Deutsch concluded that "employees will be more likely to engage in costly [personally] OCB the more attractive the expected rewards from revealing these capabilities, and the fiercer the competition for organizational reward is among employees" (Salamon & Deutsch, 2006, p. 195).
- In a 2001 paper studying the causes of OCB it was concluded that, "motives play an important role in OCB" (Rioux & Penner, 2001, p. 1313).
- In 1999 a study on Contextual Performance and Reward Decisions found that individuals who engage more frequently in OCB are more likely to be recommended for organisational rewards (Kiker & Motowidlo, 1999).
- In 1996 a meta-analysis found that employees are less likely to engage in OCB when they are indifferent to rewards (Podsakoff, MacKenzie, & Bommer, 1996).
- In 1993 whilst studying the impact of OCB on employee evaluations it was found that, "OCBs consistently accounted for a larger proportion of the variance in managerial evaluations than objective sales productivity" (MacKenzie, Podsakoff, & Fetter, 1993, p. 71).

It is not concluded that DB cannot occur without incentives, but rather that employees are generally more inclined to exhibit DB if they believe they will benefit from it. It follows that the use of incentives is a viable way to improve DB, and hence the overall performance of an organisation as illustrated in Figure 2-2. Various nuances and risks exist. These are touched upon in the subsection below, and incorporated into the final artefact through the findings from the structured literature review.

2.2.3) Incentives

This subsection contains a literature review of incentives.

Having noted the importance of employee performance, how it is related to Discretionary Behaviour (DB), and that DB can be stimulated through the use of incentives, a preliminary literature review of incentives follows.

2.2.3.1) Introduction

Incentives are used in every part of society. They form such an integral part of how humanity operates that we do not even notice many of them. One does not turn on a kettle or look out for traffic before crossing the road arbitrarily. There are good reasons for doing this, good incentives; in this case probably making coffee and not getting run over. People often use incentives to align other people's goals with their own. Consider a father who wants his lawn mown and has a son who is indifferent to the state of the lawn. The father is likely to offer the son a reward for mowing the lawn; alternatively the father might threaten the son with some sort of punishment if he does not mow the lawn. Both of these actions incentivise the son to do what his father wants; the incentives align the father's and the son's goals. Businesses and organisations use incentives in a similar fashion to align employees' goals with their own. They attempt to motivate employees to do what is important for the company. This is no elementary task; a lot of research and consideration has gone into determining the best way to incentivise the various employees in a company. Two of the most influential authors in the field of incentives, Bengt R. Holmström and Paul Milgrom, asked an ongoing question in a 1991 article that illustrates the challenges researchers are faced with even today: "Given a highly incomplete set of performance measures and a highly complex set of potential responses from the agent, how can the agent be motivated to act in the social interest?" (Holmström & Milgrom, 1991, p. 50).

The field of incentives is wide and integrates knowledge form many fields such as economics, management, organisational theory, psychology, finance, and human resources. Due to the range of expertise among authors contributing to the field it can be difficult to identify leading authors and influential works. As a supplement to a generic or ad hoc preliminary literature review a structured methodology was followed to ensure that the key works and leading authors were identified and considered. This process is not catalogued for brevity's sake, it is a simplified version of the structured literature review that can be found in Chapter 5. Leading authors were found, as expected, to contribute to a range of topics. It is thus more useful to identify key works. A selection of 33 works were identified as 'influential works'. Eleven of these works were found to be distinguishedly well referenced by the other 'influential works'. It was reasoned that these works are thus the key influential works in the domain. They are:

- Incentives and organizations in the public sector: An interpretative review (Dixit, 2002).
- Performance pay and productivity (Lazear E. P., 2000).
- The provision of incentives in firms (Prendergast, 1999).
- Incentive contracts and performance measurement (Baker G. P., 1992).
- Multitask principal-agent analyses: Incentive contracts, asset ownership, and job design (Holmström & Milgrom, 1991).
- Performance pay and top-management incentives (Jensen & Murphy, 1990).
- Compensation and incentives: Practice vs. theory (Baker, Jensen, & Murphy, 1988).
- Aggregation and linearity in the provision of intertemporal incentives (Holmström & Milgrom, 1987).
- Managerial incentive problems: A dynamic perspective (Holmström, 1999).
- Moral hazard and observability (Holmström, 1979).
- Incentives, risk, and information: Notes towards a theory of hierarchy (Stiglitz, 1975).

Note that the list of key influential works generated in Chapter 5 is much more rigorous, and was used for the analysis in the structured literature review. The final list contains eight out of the eleven papers above, and introduces twelve more papers as key influential works.

2.2.3.2) The Importance of Incentives

> *"The one issue that should be considered by all organization theories is the relationship between pay and performance."*
>
> *- (Lawler, 1971, p. 273)*

This research was primarily interested in incentives in an organisational context as a means to align a principal and an agent's goals, and to motivate the agent to maximise the agent's level of performance. It is almost universally accepted that the use of incentives is an important tool. Papers and research related to incentives rarely defend this premise, they take it as a given. Examples of works containing empirical studies or surmising empirical studies proving that agents do indeed respond to incentives include Lazear (2000), Bandiera et al. (2005), Prendergast (1999), Groves et al. (1994), and Siemsen et al. (2007).

Whilst it is safe to conclude that the majority of academics recognise the potential of incentives, there are critics. The understanding of a theory can often be improved by examining the arguments of its critics. Alfie Kohn, a prominent American critic of money as motivator (Colvin, 1998), asserts that incentive strategies must fail because of "the inadequacy of the psychological assumptions that ground all such plans" (Kohn, 1993a, p. 54). In response to Kohn's assertions, nine experts wrote responses to the Harvard Business Review in 1993. They adamantly refuted Kohn's claim that incentives cannot work (Stewart, et al., 1993). The nine responders agree with Kohn and the mainstream literature, that there are many considerations that have to be made when incentives are implemented and that incentives often have negative effects. They were adamant, however, that the complete removal of incentives is unwarranted and ill-advised. The argument continues that since the responsiveness of ordinary citizens to incentives is demonstrated daily in our economy we should not expect it to be different in the workplace. It is noted that incentives can have negative effects and that care has to be taken when plans are designed. This necessitates an awareness and understanding of the many considerations related to motivation practices and incentive plans.

While it is clear that incentives play an important role in an organisation, the theory and implementation of incentives is complex. Detrimental effects are common with incorrect application. The argument continues that summarily doing away with incentives will lead to a loss of individual motivation and a lack of organisational innovation that characterises companies and societies without extrinsic incentives. One of the responders, McAdams, concludes that: “The bottom line is simple: reward plans work when properly designed and supported; there can be something in it for everyone” (Stewart, et al., 1993, p. 42). The phrase 'properly designed and supported' is vital. It is crucial that research and development is done to ensure that incentives are holistically designed for each specific circumstance and individual. Despite concerns and arguments against the use of incentives, most organisations use incentives in some form (Rynes, Gerhart, & Parks, 2005). Moreover, this use appears to be growing, rather than declining (Heneman, 2002).

2.2.3.3) The Status Quo of the Literature: Roots

Early Roots

Philosophies driving incentives, motivation, and control have been around as long as history can record. This study will not be aided by a historical analysis dissecting how control was exerted and incentives utilised in early cultures and civilisations. What can be considered the ‘roots’ of modern theories on incentives in organisations dates back to the early 1900s. A mechanical engineer, Frederick Winslow Taylor, believed businesses were being run in an inefficient, haphazard way (Taylor, 1911). He developed a form of management to address this issue termed ‘scientific management’ and is today regarded as the first management consultant and the father of scientific management (The Wall Street Journal, 1997).

On a basic level Taylor argued that men are inherently lazy and seek the easiest option available to them: “There is no question that the tendency of the average man (in all walks of life) is toward working at a slow, easy gait, and that it is only after a good deal of thought and observation on his part or as a result of example, conscience, or external pressure that he takes a more rapid pace” (Taylor, 1903). Following this evaluation Taylor’s basic approach is described by Daniel Pink as, “you simply rewarded the behavior you sought and punished the behavior you discouraged. People would respond rationally to these external forces — these extrinsic motivators — and both they and the system itself would flourish” (Pink, 2009, p. 19). Taylor is often blamed for dehumanising the worker, especially by today’s psychologists. Addressing this criticism Peter Drucker states that, “To belittle Taylor because in 1880 he did not know post-Freudian psychology is somewhat like belittling Isaac Newton for not knowing quantum mechanics or non-Euclidian geometry in 1690” (Drucker P. F., 1986, p. 144).

Divergence from Roots

As economies become more complex and employees started engaging in more complicated tasks the basic 'carrot and stick' model started encountering resistance (Pink, 2009). The use of extrinsic motivators was being questioned and Intrinsic Motivation become more researched. In the 1950s Abraham Maslow developed the field of psychology which questioned the idea that human behaviour was purely the seeking of positive stimuli and avoidance of negative stimuli. Douglas McGregor, drawing from Maslow's work, stated in a November 1957 paper for *Management Review* that, "The carrot-and-stick theory does not work at all once man has reached an adequate subsistence level and is motivated primarily by higher needs" (McGregor, 1960, p. 169). The basic form of the theory of incentives in organisations was set. Employees were to be motivated through incentives that address not only basic needs, but higher needs as well.

2.2.3.4) The Status Quo of the Literature: Traditional Thinking – State of the Art

Having discussed the importance of incentives and what objections critics make in the 'Importance of Incentives' subsection above, this subsection explores some of the themes found in the theory of incentives.

Overview

Since the interests of workers and their employees are not always aligned, a large quantity of theoretical literature has emphasised how firms design compensation contracts to induce employees to operate in the firm's interests. The literature has reached into many areas of compensation and has pointed to a multitude of different mechanisms that can be used to induce workers to act in the interests of their employers. These include Piece Rates, Options, Discretionary bonuses, Promotions, Profit-sharing, Efficiency Wages and Deferred Compensation (Prendergast, 1999).

Motivation – Intrinsic and Extrinsic

There are two schools of thought regarding motivation. Some authors see motivation as being contained within the individual whereas others view it as arising from sources outside the individual (Stroh, 2001). There are authors who assert that the primary aim of incentives is to enhance extrinsic motivation by satisfying an individual employee's needs indirectly through means of pay and bonuses (Anthony & Govindarajan, 2007; Kunz & Plaff, 2002). Some authors argue that incentive pay has a negative effect on Intrinsic Motivation – a 'crowding-out' effect (Gagne & Deci, 2005). The wider literature, however, agrees that intrinsic and extrinsic motivation could be complementary in an organisational setting (Dermer, 1975; Kominis & Emmanuel, 2005; Kunz & Plaff, 2002). The 'Tension in the Domain' subsection below discusses this in more detail.

Dysfunctional Behavioural Responses - Gaming

Contracts offering incentives can give rise to dysfunctional behavioural responses where agents emphasise only those aspects of performance that are rewarded (Prendergast, 1999). This behaviour is called 'gaming'; exploitation of an incentive plan by an agent for the agent's own self-interest, to the detriment of the objectives of the incentive designer (Ederer, Holden, & Meyer, 2013, p. 1). Ederer, Holden and Meyer went on to identify three forms of gaming:

1) "Diversion of effort away from activities that are socially valuable but difficult to measure and reward, towards activities that are easily measured and rewarded." Evidence - (Burgess, Propper, Ratto, & Tominey, 2012; Carrell & West, 2010).
2) "Exploitation of the rules of classification to improve apparent, though not actual, performance." Evidence - (Gravelle, Sutton, & Ma, 2010).
3) "Distortion of choices about timing and/or pricing to exploit temporarily high monetary rewards even when socially efficient choices have not changed". Evidence - (Oyer, 1998; Forbes, Lederman, & Tombe, 2012).

Various factors impact gaming. The dangers of gaming are heightened when the agent has a superior knowledge of the environment. Scholars suggest that being deliberately ambiguous about the criteria upon which rewards will be based can help deter gaming.

Performance Measurement

In order for incentives to be effective it is important that performance can be measured in such a way that agents perceive it to be fair (Grigoriadis & Bussin, 2007). The literature distinguishes between two main types of performance measurement; objective measures and subjective measures (Baker, Jensen, & Murphy, 1988). Each approach has advantages and disadvantages. Subjective performance measurement can be used for any job and is a good way of restricting gaming but can be seen as unfair by employees, is often inaccurate, and can harm group cohesion (Folger & Konovsky, 1989). Objective performance measurement is a good way to remove subjectivity and unreliability from performance measurements (Lawler, 1971) and stimulate positive sorting (Bishop, 1987), but is hard to specify for many jobs and is more conducive to gaming. Subjective and objective performance measurement methods vary, one notable variation of subjective performance evaluation is the '360-degree' evaluation where an employee's performance is assessed from all sides of the functional hierarchy: by superiors, peers and subordinates. Evidence suggests that 360-degree approaches are effective (Hazucha, Hezlett, & Schneider, 1993; Reilly, Smither, & Vasilopoulos, 1996). Tournaments or contests are another mechanism that is sometimes used to measure performance. This is a variation of objective performance measurement, but the literature suggests that it is even harder to successfully implement (Che & Gale, 2003; Fullerton & McAfee, 1999).

Individual vs. Group Incentives

Organisations have been criticised for focusing too much on individual incentives. It is argued that teamwork is discouraged as individuals attempt to advance their own well-being at the cost of co-workers and the organisation (Demming, 1986; Pfeffer, 1998). It is also argued that high pay dispersion harms group productivity (Pfeffer & Langton, 1993; Bloom M. , 1999). The disadvantages of group incentives include the 'free-rider' problem and negative sorting effects. The 'free-rider' problem refers to individuals in a group who underperform as they are not individually rewarded; rational individuals would not put in as much effort if they only share a fraction of the benefits. The negative sorting effects occur as individuals who perform well and would benefit from individual incentives might leave a company where the group is rewarded (Weiss, 1987).

Further Considerations

Further considerations that are not covered in this preliminary literature review for brevity's sake include:

- Job Complexity – Individuals performing complex tasks and those performing simple tasks respond differently to incentives.
- Career Concerns – Agency contracts can be negotiated over time.
- Personalities and Personal Circumstances – Different rewards are important to different people.
- Sorting – Different incentive plans attract different individuals to companies.
- Job design – Some authors suggest tailoring jobs so that performance measurement can be more reliable.

2.2.3.5) The Status Quo of the Literature: Contemporary Theories and Controversy

Criticism of Traditional Incentives and Answers to the Criticism

There are varying views as to how people are motivated and how they should be incentivised. The theories opposed to basic traditional incentives stem from hypotheses formulated by Maslow, Herzberg, and Deci & Ryan (Rynes, Gerhart, & Parks, 2005). A brief description of the authors' arguments follows:

- Maslow posited that human needs are arranged in a hierarchy with basic needs at the bottom and 'higher' needs at the top. He postulated that once an individual moved up the hierarchy past the basic needs typical incentives would no longer be effective (Maslow, 1943).
- Herzberg's motivation-hygiene theory focused on identifying factors that contribute to either satisfaction or dissatisfaction at work (Herzberg, Mausner, Peterson, & Capwell, 1957). He postulated that money was more likely to be a 'hygienic' factor; that money played a role in creating or reducing dissatisfaction, but not in contributing to satisfaction or motivation.
- Whilst being more complicated, on a basic level Deci & Ryan's cognitive evaluation theory argued that placing a strong emphasis on monetary rewards is likely to decrease people's intrinsic interest, thus dampening a potentially powerful alternative source of motivation (Deci & Ryan, 1985).

The basic counterarguments against these theories are as follows:

- Maslow: "Money can buy food, security, social relations, and esteem, and to some extent, it can satisfy self-actualization needs" (Lawler, 1971, p. 26). Subsequent research continues to support this argument (Frank, 1985).
- Herzberg: As per Lawler's argument above, Herzberg's research is challenged. In Hertzberg's own research and more so in other authors' surveys, pay was likely to be mentioned as a form of motivation, especially when it was seen as a form of recognition (Lawler, 1971, pp. 32-33).
- Deci & Ryan: The negative relationship between rewards and intrinsic interest as postulated by Deci & Ryan is still debated, with support for the theory mixed at best (Rynes, Gerhart, & Parks, 2005). Deci & Ryan themselves found in a 1999 study "no effect [on Intrinsic Motivation] for performance-contingent rewards" (Deci, Koestner, & Ryan, 1999, p. 644) and that extrinsic rewards were "more detrimental for children than for college students" (Deci, Koestner, & Ryan, 1999, p. 656). This raises concern about their theory's generalisability as a large part of cognitive

evaluation theory-inspired research has been conducted in a laboratory setting (Rynes, Gerhart, & Parks, 2005). Adults are also the demographic of interest; if the theory holds less for students than for children it might imply that it is not specifically relevant for adults.

In summary, although the ideas developed by Maslow and Herzberg have had considerable appeal to many people, opponents assert that the prevailing view in the academic literature is that the specific predictions of these theories are not supported by empirical evidence (Kanfer, 1990). Although Deci and Ryan's ideas have received stronger (albeit mixed) support, they remain largely untested in ongoing work settings, which differ in important ways from the laboratory settings in which they have been investigated. In order to illustrate an extreme and more balanced interpretation of the theories just described, Alfie Kohn and Daniel Pink's work will be briefly examined. Both authors have published extensively; the scope of this illustration is not an exhaustive analysis, but simply a representation of their arguments.

Alfie Kohn - Why incentive plans cannot work (Kohn, 1993a)

There is no need to reiterate the assumptions that Kohn made to arrive at his hypothesis. They are very much in line with Maslow, Herzberg, and Deci. Kohn (1993a) strongly counselled that reward systems will fail and gives the following reasons:

- Pay is not a Motivator: "It doesn't necessarily follow that doubling that person's pay would result in better work."
- Rewards Punish: "Managers are creating a workplace in which people feel controlled, not an environment conducive to exploration, learning, and progress."
- Rewards Rupture Relationships: "Very few things threaten an organization as much as a hoard of incentive-driven individuals trying to curry favor with the incentive dispenser."
- Rewards Ignore Reasons: "managers often use incentive systems as a substitute for giving workers what they need to do a good job."
- Rewards Discourage Risk Taking: "the number one casualty of rewards is creativity."
- Rewards Undermine Interest: "The more a manager stresses what an employee can earn for good work, the less interested that employee will be in the work itself."

Kohn's incentive plan is to not to use incentives, especially not monetary incentives: "Pay people well and fairly, then do everything possible to help them forget about money". When pressed, however, Kohn seems to condone group incentives and profit-sharing. He goes on to suggest the following three 'sources of excellence' (Kohn, 1993b, p. 49):

- Choice: "Employees should be able to participate in making decisions about what they do every day."
- Collaboration: "Structure teams in order to facilitate an exchange of ideas and a climate of support."
- Content: "If you want people motivated to do a good job, give them a good job to do."

Daniel Pink – Drive: The Surprising Truth About What Motivates Us (Pink, 2009)

As above there is no need to study the assumptions that underlies Pink's hypothesis. Pink is an ardent follower of Deci but does not draw from Herzberg. He focuses on Intrinsic Motivation and is a proponent of Type I behaviour as conceptualised by McGregor.

Pink argues that while there are limited and specific situations where rewards/punishments can effectively motivate people, they actually decrease Intrinsic Motivation. He warns that they should be applied sparingly and only with care and planning. As an alternative Pink suggests using, what he terms, the three elements of Intrinsic Motivation; Autonomy, Mastery, and Purpose. A brief description of these follows:

- Autonomy: The human desire to act with choice and have some control over our environment.
- Mastery: The desire to get better and better at something – the process of engaging in a task simply for the joy of doing the task well.
- Purpose: Living by our core values and being invested in something greater than ourselves.

Pink surmises this by writing, "The secret to high performance isn't our biological drive or our reward-and-punishment drive, but our third drive—our deep-seated desire to direct our own lives, to extend and expand our abilities, and to live a life of purpose" (Pink, 2009, p. 245).

Pink suggests a range of actions that can be taken to motivate employees. In addition to actions that implement Autonomy, Mastery, and Purpose some actions he suggests related to incentives are:

- make groups 'no competition' zones – competition undermines Intrinsic Motivation;
- ensure internal and external fairness;
- pay more than average;
- if you use performance metrics, make them wide-ranging, relevant, and hard to game.

2.2.3.6) Tension in the Domain

In order to understand the domain as a whole one must be familiar with the tension in the domain. Economists assert that incentives are effective and point to a large body of empirical evidence supporting this (Lazear E. P., 2000; Bandiera, Barankay, & Rasul, 2005; Groves, Hong, McMillan, & Naughton, 1994; Siemsen, Balasubramanian, & Roth, 2007; Prendergast, 1999). On the other hand, behavioural scientists advocate moving away from extrinsic motivators and focusing on Intrinsic Motivation (Kohn, 1993a; Deci, Koestner, & Ryan, 1999; Pink, 2009). The reason for this includes both dysfunctional behavioural responses to extrinsic incentives, and what is referred to as the 'crowding-out effect', where extrinsic incentives dampen Intrinsic Motivation.

When the arguments are considered it would seem that both sides present valid arguments. Proponents of extrinsic incentives are aware that "Money is a very powerful motivator indeed. In fact, it is so powerful that one of the main challenges for managers is to make sure that their compensation systems are not motivating the wrong kinds of behaviors", and respected economists such as Prendergast (2008, p. 201) observed that "The economic literature has offered little in terms of understanding relevant trade-offs when alignment of inherent preferences (rather than monetary interests) is what motivates people". It has thus been remarked that the problem with incentives is not that they do not work, but that they work too well. So well that they can lead to the wrong behaviour, or crowd out Intrinsic Motivation as described by Deci. It could be deduced that the ideal solution lies somewhere between the two positions when taken as extremes.

This deduction is not unique or novel. Welch (2003), while being sensitive to the importance of Intrinsic Motivation, lamented the tendency to undermine the usefulness of incentives. He asserted that performance evaluation and pay-for-performance are two of the most powerful tools in an organisation's motivational arsenal. On the other side even Deci acknowledges situations where extrinsic incentives do not necessarily undermine Intrinsic Motivation (Deci, Koestner, & Ryan, 1999). Along these lines Cerasoli, Nicklin, & Ford concluded that:

> *"In general, our most important theoretical and empirical contribution is that incentives and intrinsic motivation are not of necessity antagonistic: We found that incentives coexist with intrinsic motivation, depending on the type of performance and the contingency of the incentive. The types of desirable and undesirable performance behaviors should first be considered, because they will drive the appropriate degree of incentive salience. Counter to claims otherwise, our research demonstrates the joint impact of incentives and intrinsic motivation is critical to performance."*
>
> *- (Cerasoli, Nicklin, & Ford, 2014, p. 1001)*

The structured literature review supports this insight. The PICs reflect both extrinsic and intrinsic considerations.

2.3) Overview of the Structured Literature Review Findings

This subsection gives an overview of the findings from the structured literature review from Chapter 5.

2.3.1) Learning by Building

While this document communicates the research in a linear fashion, the research process contains many undocumented iterations. Some academics refer to a process of learning through building, which aligns well with pragmatism's focus on constructive knowledge. The identification of the problem statement was not sufficient to deduce a suitable solution from it. Once more was learned about the problem, through the formulation of knowledge (see Chapter 1.3.3.3), the form of a suitable solution became clearer. In the same manner, details concerning the suitable solution became clearer during its construction. The findings of the structured literature review, as can be found in Chapter 5 and Appendix A.1, contributed to the need and selection of a Decision Support System as an appropriate artefact. The findings also help to validate the gap in the literature as discussed in Chapter 1.4.1. As such it is helpful to provide the reader with an overview of these findings as part of the theoretical background.

2.3.2) The Basic PIC Model

The structured literature review identified 13 Primary Incentive plan design Considerations (PICs). Job Design, while not a primary consideration, was recognised as a potent tool that can be used to significantly influence many of these considerations. The PICs were sorted into three categories: Input Considerations, Underlying Considerations, and Response Considerations. An overview of each of the three categories and a definition of each PIC follows Figure 2-3, which depicts a basic model of the findings. The basic model shows the relationships that exist between the different groups of PICs, Incentive Mechanisms, and Job Design. On a basic level it depicts the Input Considerations that need to be made when Incentive Mechanisms are considered, the Response Considerations to any Incentive Mechanisms, and how the Underlying Considerations and Job Design are influenced and can be used to influence any of the above. These links are explored in detail during the development of the DSS.

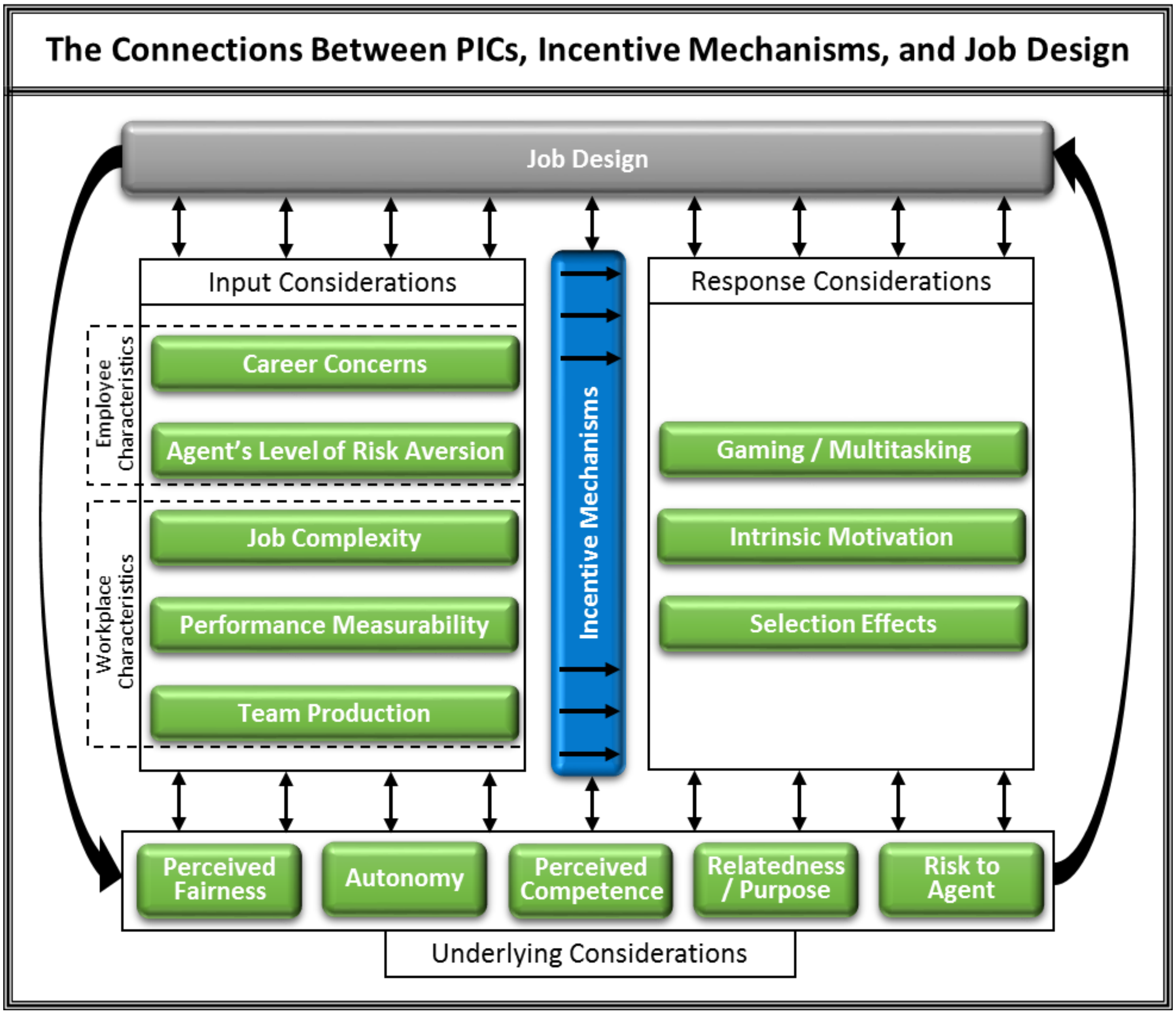


Figure 2-3: The Primary Incentive plan design Considerations (PICs) grouped into three categories

The 13 PICs are defined in conjunction with the three categories that the PICs are grouped into in Figure 2-3. Unless a specific paper is cited, the definitions were constructed by the author from the Key Influential Works.

2.3.2.1) Input Considerations

Input considerations can be thought of as the pieces of the puzzle that define the playing field for an incentive plan. They describe the situation and personnel where the incentive plan is to be implemented. These input considerations will thus be different for different jobs or workplaces, as well as individuals. Five of the 13 PICs were classed as input considerations:

- Career Concerns (Employee): "Concerns about the effects of current performance on future compensation" (Gibbons & Murphy, 1992, p. 468).
- Agent's Level of Risk Aversion (Employee): The reluctance of a person to accept a bargain with an uncertain payoff rather than another bargain with a more certain, but possibly lower, expected payoff (Adapted from Key Influential Works).

- Job Complexity (Job): A measure of the complexity associated with a specific job or "the skill requirements of a job's work tasks" (Tahlin, 2011, p. 55).
- Performance Measurability (Job): A measure of the ease and accuracy with which an individual's performance on a specific job can be measured (Adapted from Key Influential Works).
- Team Production (Job): Considerations related to incentivising groups or individuals with a considerable level of Task Interdependence (Adapted from Key Influential Works).

2.3.2.2) Underlying Considerations

Underlying considerations are those considerations that need to be taken into account in any situation. While every job might not allow each of them to be perfectly satisfied, they act as an amplification factor. The better underlying considerations are designed, the better the overall resulting motivation will be. Five of the 13 PICs were classed as underlying considerations:

- Perceived Fairness: The experience of fair treatment by the organisation (Adapted from Key Influential Works).
- Autonomy: "Autonomy involves feeling internal assent regarding one's behaviour, rather than feeling controlled or pressured" (Sheldon & Filak, 2008, p. 267).
- Perceived Competence: "Feeling efficient, effective, and even masterful in one's behaviour, rather than incompetent and ineffective" (Sheldon & Filak, 2008, p. 267).
- Relatedness/Purpose: "Feeling meaningfully connected to others, rather than feeling alienated or ostracised" (Sheldon & Filak, 2008, p. 267).
- Risk to Agent: The amount of risk that an employee will be exposed to in term of inherent risk and risk imposed by the incentive plan (Adapted from Key Influential Works).

2.3.2.3) Response Considerations

Response considerations can be thought of as the response of the employee to the Incentive Mechanisms. This can be both conscious and subconscious, and positive or negative. Response considerations are thus something of a measure of the successfulness of an incentive plan. Yet they need to be well understood so that the Incentive Mechanisms can be designed in such a way that they are positive. Three of the 13 PICs were classed as response considerations:

- Gaming/Multitasking: The "exploitation of an incentive scheme by an agent [employee] for his own self-interest, to the detriment of the objectives of the incentive designer" (Ederer, Holden, & Meyer, 2013, p. 1).
- Intrinsic Motivation: "The inherent tendency to seek out novelty and challenges, to extend and exercise one's capacities, to explore, and to learn" (Ryan & Deci, 2000b, p. 70).
- Selection Effects: "The impact of PFP [Pay for Performance] on the attributes of the workforce through differential attraction and retention processes" (Rynes, Gerhart, & Parks, 2005, p. 582).

2.4) Summary

This subsection concludes Chapter 2: Theoretical Background.

Employee performance is important to organisations and related to employees exhibiting Discretionary Behaviour (DB), which is "work-related behaviour outside the domain of traditional task statements that promotes the effective functioning of the organisation." While DB is important to all employees, it is even more so to employees with more complex jobs, or with more managerial concerns. DB can be stimulated by incentives. In line with this, Lawler (1971, p. 273) asserted almost a half-century ago that:

> *"The one issue that should be considered by all organization theories is the relationship between pay and performance".*

Incentives essentially address the ongoing question posed in 1991 by two of the most influential authors in the field of incentives, Bengt R. Holmström and Paul Milgrom:

> *"Given a highly incomplete set of performance measures and a highly complex set of potential responses from the agent, how can the agent be motivated to act in the social interest?"*

Note that the authors are not only concerned with 'how can the agent be motivated?', they consider motivation that drives the agent/employee to 'act in the social interest'. In the same way the definition of DB is not only concerned with higher levels of activity, but specifically higher levels of activity that 'promotes the effective functioning of the organisation'. It is accordingly important to note that when incentives and performance are considered, two things need to be taken into account: Employees' motivation levels and goal alignment. An arrow that is not on target is useless regardless of its velocity; a highly motivated employee is useless if not motivated to do the right things.

While it is clear that incentives play an important role in an organisation, the theory and implementation of incentives is complex. Detrimental effects are common with incorrect application. Economists typically assert that incentives are effective and point to a large body of empirical evidence supporting this; behavioural scientists often advocate moving away from extrinsic motivators and focusing on Intrinsic Motivation. It was found that incentives and intrinsic motivation are not of necessity antagonistic. Counter to claims otherwise, the joint impact of incentives and intrinsic motivation is critical to performance. This can only occur when incentives are appropriately designed and supported. The phrase 'properly designed and supported' is vital. It is important that research and development is done to ensure that existing knowledge can be utilised to design, evaluate, or improve organisations' incentive practices. Despite concerns and arguments against the use of incentives, most organisations use incentives in some form. Moreover, this use appears to be growing, rather than declining.

The structured literature review identified 13 PICs (Primary Incentive plan design Considerations). These PICs were related to both extrinsic and intrinsic considerations.

Chapter 3: The Decision Support System (DSS)

"I must have a prodigious quantity of mind;

it takes me as much as a week sometimes to make it up."

-Mark Twain

3.1) Introduction

This subsection introduces Chapter 3: The Decision Support System.

Chapter 3 gives an overview of the purpose and specifications of the artefact. It then goes on to explore the literature surrounding Decision Support Systems (DSS), before configuring an appropriate DSS to satisfy the research requirements. The final form of the artefact can thus be specified. This chapter is structured as follows:

- Chapter 3.1) Introduction
- Chapter 3.2) Artefact: Purpose and Specifications
    - An overview of the purpose and specifications of the artefact.
- Chapter 3.3) DSS: Literature Review
    - A review of the DSS literature.
- Chapter 3.4) Configuring an Appropriate DSS
    - An appropriate DSS is configured in light of the literature review. The result is used to confirm the suitability of a DSS as the form of the artefact.
- Chapter 3.5) The Final Form of the Artefact
    - The final form of the artefact is specified.
- Chapter 3.6) Summary

3.2) Artefact: Purpose and Specifications

This subsection gives an overview of the purpose and specifications of the artefact.

The extended problem statement (see Chapter 1.4) discusses how the performance of organisations is adversely affected by employees who are not appropriately incentivised. The process of improving organisational performance through the use of incentives is illustrated in Figure 2-2. In light of this the research asked how organisations can utilise the wider literature on incentives to enhance employee performance (See Chapter 2.2, and 2.2.2.3 specifically). This is addressed through the development of an artefact which can be used as an aid to improve organisations' practices regarding employee incentives.

3.2.1) Artefact Purpose and Primary Function

This subsection discusses the purpose and primary function of the artefact.

As per Figure 2-2, applying the correct incentives naturally leads to improved organisational performance. The main purpose of the artefact is to help users to apply incentive appropriately. In order to do this the artefact must be able to enhance related decision-making in terms of both quality and speed.

The artefact is to fulfil its purpose by helping users to make the correct decisions when incentive plans are considered. In order to do this the artefact must draw from, and build on, the findings of the extensive, multidomain, structured literature review (Refer to Chapter 2.3, or Chapter 5). This literature review culminated in 13 PICs, the Primary Incentive Plan design Considerations. The artefact must help users to understand the PICs, and how they are related to the Elements of Job Design, and Incentive Mechanisms themselves. By containing and communicating the right information effectively the DSS can be used to improve organisations' practices regarding employee incentives. As discussed in Chapter 1.3.3.3 and Figure 1-2 the purpose of the artefact could be described as increasing the usability and relevance of knowledge to users for decision-making purposes.

In short, the artefact helps users to apply Incentive Mechanisms correctly and efficiently, by helping them to make the correct design decisions based on the information extracted from the systematic literature review.

3.2.2) Place of Artefact in Overall Incentive Plan Implementation Process

This subsection clarifies the scope of the artefact.

When incentive plans are to be implemented a certain process is followed. This artefact is to specifically address one of the steps in this process, but not the process in its entirety in detail. The typical steps involved with the implementation of an incentive plan, as derived from Holtmann & Grammling (2005), Bussin (2008), Horizon (2013), Berchelmann (2007), and VisionLink (2009), are shown in Figure 3-1:

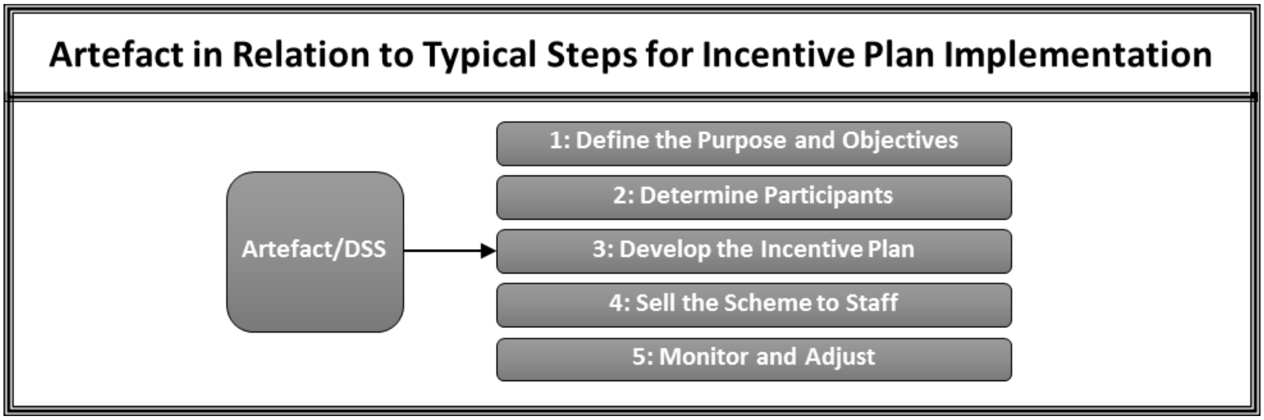


Figure 3-1: The artefact is to focus on the third step, 'develop the incentive plan', of the typical incentive plan implementation procedure

It follows naturally that the results of step 1 and 2 have a great effect on the development that takes place in step 3, and that the development in step 3 influences the approach and difficulty of step 4 and 5.

The artefact is thus focused on the development or design considerations. Yet, while the artefact is not focused on strategy or implementation, it will have some influence in these areas.

3.2.3) Target Audience – The Users of the Artefact

This subsection discusses the artefact's users.

On a high level the artefact is to be designed to aid any individual who is concerned with or interested in how incentive practices influence employee motivation. These individuals may occupy various positions within an organisation, and have various backgrounds, depending on the configuration of the organisation. It follows that some users can utilise the artefact more fully or effectively than others. Some of the user characteristics which would influence the usability of the artefact is as follows:

- Decision-making capacity: Users who can determine or modify factors such as working conditions, remuneration practices, or strategy can use the artefact more fully than users who cannot. The more 'levers' a user has access to, the more fully the artefact can be utilised.
- Operational insight: The more knowledge a user has of factors such as the technical, procedural, cultural, interpersonal, or organisational considerations, the better the user would be at applying the insights provided by the artefact.

It is worth noting that the artefact could be used for various other purposes by different individuals. In addition to typical uses such as aiding with the design or evaluation of incentive practices, or identifying threats or opportunities, the artefact could also be used for training or educational purposes, or referenced during strategy or policy formulation.

3.2.4) Functionality and Design Specifications

This subsection lists the artefact's required practical functions and low-level design specifications.

The purpose and primary function discussed above is to be satisfied with a set of required practical functions, which lead to certain low-level design specifications (the low-level design specifications assume a typical DSS structure). Note that the purpose and primary function mirrors the functional specifications as discussed in Chapter 4.2.1.1. The low-level design specifications that follow correspondingly satisfy the technical specifications. The setting or situation that this occurs in is, and must be, aligned with the scenario-based specifications. In essence the required practical functions and low-level design specifications is a more detailed extension of the high-level specifications as discussed in Chapter 4.3.1. The required practical functions and low-level design specifications of the artefact are listed below, with limitations where applicable, in the indicated format:

#) Required Practical Functions.
- Low-level Design Specifications.
  - Limitations.

1) The artefact must be able to make users aware of the important considerations that have to be taken into account with regards to employee motivation and incentives.
   - The artefact's Knowledge Base must contain and describe the important considerations.
     - It follows that the artefact will not contain all considerations, but specifically isolate the most important considerations according to the literature.
   - The artefact must be able to communicate the important considerations.

2) The artefact must be able to make users aware of the mechanisms that can be used to influence the above-mentioned considerations.
   - The artefact's Knowledge Base must describe and integrate the typical incentive mechanisms.
     - Only typical or types of mechanisms are required, every specific existing mechanisms does not have to be described individually. Exhaustive detail is not required, the detail should only be enough to describe the basic functions of the type of mechanisms. This also helps with information overload. Enough sources are available that describe specific mechanisms in detail.
   - The artefact must be able to communicate the typical incentive mechanisms.

3) The artefact must be able to help users understand how the mechanisms influence the considerations.
   - The artefact's Knowledge Base must contain information on the links between the mechanisms and the considerations.
   - The artefact must be able to communicate these links clearly.

4) The artefact must instruct users that the considerations are not isolated, but part of an integrated system, and hence has links between them.
    - The artefact's Model Base must organise the Knowledge Base into an integrated system.
    - The artefact's User Interface and description must not only clearly communicate the links, but ensure that users will understand that the various considerations and mechanisms are intricately linked.

5) The artefact must be able to help users understand the links between the considerations.
    - The Knowledge Base must contain a description of the links between the considerations.
        - The artefact will, however, not attempt to quantify the importance of specific links. Such an endeavour is beyond the scope of the research. A large number of variables, most of which would be difficult to quantify, would be involved with such an undertaking. The artefact will thus provide the user with information to help with decision-making, but will not be able to make a decision for the user.
    - The Model Base and User Interface must communicate the links clearly to users.

6) The artefact must be able to help users understand the cascading effects, or pros and cons, of applying a specific mechanism.
    - The artefact's Model Base should incorporate not only first-degree, but also second-degree links.
        - The artefact only specifies first- and second-degree links. Where required the user can consult the base link models for further connections. Discussing specific links beyond the second-degree results in an overload of information.
    - The second-degree links must be clearly communicated in the User Interface.
    - Pros and Cons must be readily available for specific actions.
        - Weighting is not provided. The users must apply their judgement to determine the importance of each factor in the user's specific setting.

7) The artefact must be able to help users identify opportunities for improving existing practices.
    - The Model Base and User Interface must be able to satisfy this function.

8) The artefact must be able to help users identify risks, threats, or dangers associated with existing practices.
    - The Model Base and User Interface must be able to satisfy this function.

9) The artefact must be able to help users assess current practices.
    - The Model Base and User Interface must be able to satisfy this function.

10) The artefact must be able to help users in the design of new mechanisms.
    - The Model Base and User Interface must be able to satisfy this function.

11) The artefact must be reliable.
    - The information contained in the artefact's Knowledge Base must be rounded and verifiable.
    - The Model Base must be built on verifiable information or clear inferences.

12) The artefact must be easy to use.
    - The artefact should be able to present users with the necessary information to make decisions, without exposing them to details that are not relevant.
        - The artefact will not be developed to such a degree that it is ready for commercial use.

13) The artefact must be able to be used for detailed analysis if required.
    - The artefact should grant access to the details if a user requires them.
        - While the Knowledge Base and Model Base's information will be available, detailed and referenced commentary discussing possible links that were not drawn is not included.

14) The artefact must treat organisations as complex systems.
    - The artefact should treat an organisation as a complex system comprised out of various subsystems which include employees.
        - The artefact is thus not focused on a specific type of employee, but built on principles that apply in any principle-agent relationship.

These design specifications are to be met by developing a Decision Support System (DSS). The literature review, description, and verification of a DSS as a suitable artefact can be found in the following subsections.

3.3) DSS: Literature Review

This subsection contains a review of the DSS literature. A DSS has been identified as the form that the artefact will take in light of the design specifications.

When research is done on Decision Support Systems (DSSs) it does not take long to come into contact with the *'Handbook on Decision Support Systems'* (henceforth referred to as 'the handbook') edited by Burstein & Holsapple (2008). Closely examining the literature review that follows reveals that it is very intertwined with the handbook. It can fairly be asked whether this is a problem; is the literature review comprehensive or does it centre around one piece of work? This author is satisfied that the literature review is reliable, and that the prominence of the *'Handbook on Decision Support Systems'* is not only excused but required, on three grounds; the process followed, the nature of the handbook, and the metrics. The three points follow, in ascending order of persuasiveness:

Firstly, the process that was followed pointed towards the handbook. This author was not initially able to gain access to the handbook. The initial ad hoc process that was followed identified various works and certain authors started to emerge as influential in the field. When access was gained to the handbook most of these authors were found to feature in the handbook. This shows that the editors identified the authors that this author found to be influential; it also shows that this author was able to identify the authors that the editors recognised as important.

Secondly, the handbook is credible. The two-volume handbook does not represent the views of one or a few unknown authors; "Its peer-reviewed chapters are written by an international array of over 130 DSS researchers and practitioners spanning six continents" (Burstein & Holsapple, 2008, p. IX). The editors go on to claim that "The *Handbook on Decision Support Systems* serves as a 'must-read/first-read' reference point for any theoretical or practical project related to DSS investigation or study". In line with this author's observations above, the handbook is described as "the Rosetta Stone for DSS" written by "the who's who of the DSS researchers" (Lev, 2009, p. 291).

Finally, and perhaps most convincingly, most of the authors who are cited most frequently in the domain are included in the handbook. A rudimentary literature survey revealed the following:

- The authors of 10 of the 14 works identified as influential in the field were contributors to the handbook.
- Out of the handbook's 36 chapters, 10 are written by the authors identified above. (This is for volume 1, basic themes. The number for volume 2, variations, is 5 out of 35.)

A summary of the relevant data is shown in Table 3-1:

Table 3-1: Influential authors in the DSS domain contributing towards the "Handbook on Decision Support Systems"

#	Author	Type	Citations (GS)	Authors featured in handbook (Chapter # written)
1	JF Courtney	Article	528	Courtney (65)
2	P Bharati, A Chaudhury	Article	326	
3	T Bui, J Lee	Article	256	
4	D Arnott, G Pervan	Article	266	Arnott (11/34/43)
5	ST March, AR Hevner	Article	239	
6	DJ Power, R Sharda	Article	216	Power (7), Sharda (26)
7	H Demirkan, D Delen	Article	151	Delen (26)
8	PB Keenan	Article	110	Keenan (40)
9	D Borenstein	Article	100	Borenstein (61)
10	GD Bhatt, J Zaveri	Article	96	Zaveri (30)
11	DJ Power, R Sharda, F Burstein	Book	640	Power (7), Sharda (26), Burstein (6/41)
12	M Klein, LB Methlie	Book	256	
13	RH Bonczek, CW Holsapple, AB Whinston	Book	851	Whinston (64), Holsapple (2/9/22/30)
14	E Turban, J Aaronson, TP Liang	Book	3336	Turban (12), Liang (12)

#	Title
1	"Decision making and knowledge management in inquiring organizations: Toward a new decision-making paradigm for DSS"
2	"An empirical investigation of decision-making satisfaction in web-based decision support systems"
3	"An agent-based framework for building decision support systems"
4	"Eight key issues for the decision support systems discipline"
5	"Integrated Decision Support systems: A data warehousing perspective"
6	"Model-driven decision support systems: Concepts and research directions"
7	"Leveraging the capabilities of service-oriented decision support systems: Putting analytics and big data in cloud"
8	"Spatial decision support systems for vehicle routing"
9	"Towards a practical method to validate decision support systems"
10	"The enabling role of decision support systems in organizational learning"
11	"Decision support Systems"
12	"Knowledge-based decision support systems with applications in business: a decision support approach"
13	"Foundations of decision support systems"
14	"Decision Support Systems and Intelligent Systems 7th Edition"

The data shown in Table 3-1 was obtained through a literature survey using Google Scholar. The 30 most relevant search results in the domain were considered. Relevant works with a considerable number of citations were included in the 14 works listed above. The initial list of 30 was filtered as follows:

- Works were considered ranging from a decade before the handbook was published to the present date (1998–2016).
- 'Clinical' DSSs were not considered.
- Decision Support System (singular) returned results with case specific DSSs. Only Decision Support Systems (plural) was thus added to the list of 14. Note the titles of the works typically indicate works where DSSs are the focus, instead of a tool used to achieve some goal.

In light of the points discussed above it can be argued that the prominence of the *'Handbook on Decision Support Systems'* in the literature review below is not only excusable but required. This chapter continues by identifying and specifying what DSSs are, what their benefits are, and takes a closer look at the different types and components of DSSs.

3.3.1) DSS Literature Overview

This subsection provides an overview of the literature on DSSs.

"Decision support systems (DSS) is the area of the information systems discipline that is focused on supporting and improving managerial decision-making" (Arnott & Pervan, 2008, p. 657). "They provide knowledge and/or knowledge-processing capability that is instrumental in making decisions or making sense of decision situations" (Holsapple, 2008b, p. 163). Three of the most influential authors in the field, Power, Sharda, & Burstein (2015, p. 1), emphasised that "DSS is not exclusively based on the use of the computing technologies," but that it is focused on the "……ability to relax cognitive, temporal, and economic limits of decision-makers – amplifying decision-makers' capacities for processing knowledge which is the lifeblood of decision-making" (Burstein & Holsapple, 2008, p. IX).

The concepts involved in DSSs were first articulated in the early 70s by Michael S. Scott Morton (Sprague, 1980). Sprague (1980, p. 2) goes on to discuss how initial definitions were too strict, and then extended to "include any system that makes some contribution to decision-making". Neither this broad, nor the initial strict, definition aids our understanding of what exactly a DSS is. Sprague (1980) dealt with this problem by compiling key characteristics of DSS based on the works of various authors: these characteristics of DSS include:

- DSS tends to be aimed at the less well structured, underspecified problem that upper level managers typically face;
- DSS attempts to combine the use of models or analytic techniques with traditional data access and retrieval functions;
- DSS specifically focuses on features which make them easy to use by non-computer people in an interactive mode; and
- DSS emphasises flexibility and adaptability to accommodate changes in the environment and the decision-making approach of the user.

These characteristics square well with contemporary definitions such as that of Kendall & Kendall (2010, p. 559) who define DSS as: "An interactive information system that supports the decision-making process through the presentation of information designed specifically for the decision-maker's problem-solving approach and application needs. It does not make a decision for the user".

3.3.2) Benefits

This subsection explores the benefits of DSSs.

The obvious benefit of a DSS is its ability to help decision-makers make better decisions. It is, however, important to note that this is not the only benefit of a DSS; "Often, the goal is to provide a better decision process" (Pick, 2008, p. 721). A better decision-making process typically improves the chances of making better decisions, and/or improves the speed at which decisions can be made. Pick (2008, p. 719) further explained that the benefits of DSS are often subtle and gives an example where a DSS "improves understanding of the problem by the decision-maker or others in the organization." This resonates with Antony & Santhanam (2008, p. 792) who discussed how "When a user interacts with a KBS [Knowledge-Based System] and obtains help in solving a problem, the user may learn more about the problem and thus implicitly acquire knowledge". Pick (2008, p. 721) draws from works by Holsapple & Whinston and Holsapple & Sena, who recognised the following benefits:

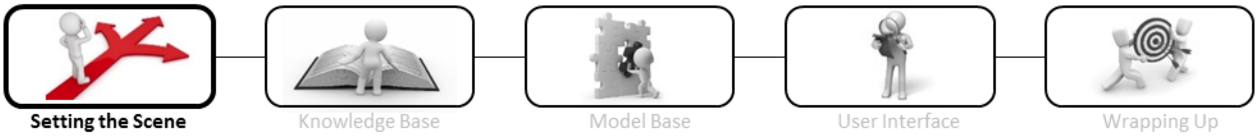
- Better knowledge processing
- Better coping with large or complex problems
- Reduced decision times
- Reduced decision costs
- Greater exploration or discovery
- Fresh perspectives
- Substantiation of decisions
- Greater reliability
- Better communication
- Better coordination
- Greater satisfaction
- Decisional empowerment
- Competitive advantage

It is very interesting to note that "All of these, except possibly competitive advantage, describe a way in which the decision process is improved" (Pick, 2008, p. 721).

3.3.3) Specifics: DSS in Detail

This subsection studies the DSS construct in more detail. This includes considering the various DSS subfields, types of DSSs, solutions given by DSSs, and components of DSSs.

The comment made in 1990 by Steven Alter, who developed the broadest and most comprehensive DSS categorising framework in 20 years according to Power (2001), that what people call DSS can "take on many different forms and can be used in many different ways" (Alter, 1990, p. 71) is perhaps even more true today. It is thus necessary to explore the subfields and categories to clarify what exactly a DSS is, and what type of DSS would be most suitable for the current research.



3.3.3.1) DSS Subfields

It is recognised that "DSS is not a homogenous field" and that the different types of DSS "can use quite different technologies and may support different managerial constituencies" (Arnott & Pervan, 2005, p. 68). Arnott & Pervan (2008, p. 657) went on to summarise the subfields as:

- Personal Decision Support Systems (PDSS): "Usually small-scale systems that are developed for one manager, or a small number of independent managers, to support a decision task".
- Group Support Systems (GSS): "The use of a combination of communication and DSS technologies to facilitate the effective working of groups".
- Negotiation Support Systems (NSS): "DSS where the primary focus of the group work is negotiation between opposing parties".
- Intelligent Decision Support Systems (IDSS): "The application of artificial intelligence techniques to decision support".
- Knowledge Management-Based DSS (KMDSS): "Systems that support decision making by aiding knowledge storage, retrieval, transfer and application by supporting individual and organisational memory and inter-group knowledge access".
- Data Warehousing (DW): "Systems that provide the large-scale data infrastructure for decision support".
- Enterprise Reporting and Analysis Systems: "Enterprise focussed DSS including executive information systems (EIS), business intelligence (BI), and more recently, corporate performance management systems (CPM). BI tools access and analyse data warehouse information using predefined reporting software, query tools, and analysis tools".

3.3.3.2) DSS Generic Types

In addition to the different sub-fields, DSSs do not operate in the same way as they make use of different types or pieces of information. Daniel Power (2001; 2008) and his colleagues (Power, Sharda, & Burstein, 2015, p. 1) classifies DSS into generic types according to the dominant technology component or driver of the DSS:

- Communications-Driven DSS: "Communications-driven DSSs use network and communications technologies to facilitate decision-relevant collaboration and communication" (Power D. J., 2008, p. 129).
- Data-Driven DDSs: "Data-driven DSSs emphasize access to and manipulation of a time series of internal company data and sometimes external and real-time data" (Power D. J., 2008, p. 127).
- Document-Driven DSS: "A document-driven DSS uses computer storage and processing technologies to provide document retrieval and analysis" (Power D. J., 2008, p. 130).
- Knowledge-Driven DSS: "Knowledge-driven DSSs can suggest or recommend actions to managers. These DSSs are person-computer systems with specialized problem-solving expertise. The expertise consists of knowledge about a particular domain, understanding of problems within that domain, and skill at solving some of these problems" (Power D. J., 2008, p. 131).
- Model-Driven DSS: "Model-driven DSSs emphasize access to and manipulation of financial, optimization, and/or simulation models. Simple quantitative models provide the most elementary level of functionality. Model-driven DSSs use limited data and parameters provided by decision

makers to aid decision makers in analyzing a situation, but in general large data bases are not needed for model-driven DSSs" (Power D. J., 2008, p. 126).

Note that a DSS may make use of more than one of the dominant technology components listed above; "Some DSS are best classified as hybrid systems driven by more than one major DSS component" (Power D. J., 2001, p. 432). In addition to the primary dimensions Power ascribed three secondary dimensions which aid our understanding of his framework, see Figure 3-2:

An Expanded DSS Framework

Dominant DSS Component	Target Users: Internal → External	Purpose: General → Specific	Deployment Technology
Communications **Communications-Driven DSS**	Internal teams, now expanding to external partners	Conduct a meeting or Help users collaborate	Web or Client/ Server
Database **Data-Driven DSS**	Managers, staff, now suppliers	Query a Data Warehouse	Main Frame, Client/Server, Web
Document base **Document-Driven DSS**	Internal users, but the user group is expanding	Search Web pages or Find documents	Web or Client/ Server
Knowledge base **Knowledge-Driven DSS**	Internal users, now customers	Management Advice or Choose products	Client/Server, Web, Stand-alone PC
Models **Model-Driven DSS**	Managers and staff, now customers	Crew Scheduling or Decision Analysis	Stand-alone PC or Client/Server or Web

Figure 3-2: An expanded DSS framework (Power D. J., 2001, p. 435)

3.3.3.3) Advisory vs. Expert Systems

The type of decisions reached or answers given by DSSs varies in terms of definitiveness; some DSSs give final answers while other DSSs leave users to apply their own judgement. Considering the six states of knowledge as depicted in Figure 1-4, the output of a DSS can range from 'insights' to 'decisions' resulting in users having to weight the insights through personal judgement to reach a decision or having no input at all. While the options are not binary, a distinction is made between advisory systems and expert systems (Beemer & Gregg, 2008, p. 511):

- Expert Systems - "Expert systems are typically autonomous problem-solving systems used in situations where there is a well-defined problem and expertise needs to be applied to find the appropriate solution."
- Advisory Systems – "In contrast, advisory systems do not make decisions but rather help guide the decision-maker in the decision-making process, while leaving the final decision-making authority up to the human user."

Beemer & Gregg (2008, p. 511) noted that "Both advisory systems and expert systems are problem-solving packages that mimic a human expert in a specialized area" and that they are "constructed by eliciting knowledge from human experts". This definition resonates with that given by Cowell et.al (2006, p. 6), who stated "Expert systems are attempts to crystallize and codify the knowledge and skills of one or more experts into a tool that can be used by non-specialists".

3.3.3.4) DSS Components

Daniel Power (2001, p. 435) observed that "Despite the significant differences created by the specific task and scope of a DSS, all Decision Support Systems have similar technical components and share a common purpose, supporting decision-making". It would seem that these components originated with Sprague (1980). Power (2001, p. 435) and George (2008, p. 425) attributed their list of components to Sprague, and as shown below the lists of other authors mirror Sprague's list as well (Burstein & Carlsson, 2008, p. 116; Zahedi, Song, & Jarupathirun, 2008, p. 319; Holsapple, 2008b, p. 165). Table 3-2 shows a summary of the DSS components as listed by various authors:

Table 3-2: DSS components as summarised by various authors

Authors	DSS Components		
[1]Sprague, 1980	Dialogue generation and management software (DGMS)	Database management software (DBMS)	Model Base management software (MBMS)
[2]Power, 2001	The User Interface	The database	The models and analytic tools & the DSS architecture and network
[3]Holsapple, 2008	A language system (LS) & A presentation system (PS)	A knowledge system	A problem-processing system (PPS)
[4]George, 2008	A User Interface	A database	A Model Base
[5]Burstein & Carlsson, 2008	Dialogue management (User Interface)	Data Management & Knowledge-based subsystem	Model Management
[6]Zahedi, Song, & Jarupathirun, 2008	Interface	Database	Model Management

[1] (Sprague, 1980, p. 14), [2] (Power D. J., 2001, p. 435), [3] (Holsapple, 2008b, p. 165), [4] (George J. F., 2008, p. 425), [5] (Burstein & Carlsson, 2008, p. 116), [6] (Zahedi, Song, & Jarupathirun, 2008, p. 319).

As derived from Table 3-2 the DSS components can be deduced to be:

- a Knowledge Base – The knowledge that the DSS utilises to solve problems;
- a Model Base – The models that the DSS employs to make sense of the Knowledge Base;
- a User Interface – The interface that the user utilises to interact with the Model Base and Knowledge Base.

All three components need to operate well for a DSS to be effective. A user cannot make use of a DSS without a User Interface. The importance and relationship between the Knowledge Base and Model Base (referred to as the inference engine here) was described by Cowell et al. (2006, p. 6) as follows: “The knowledge base is the core of an expert system; no matter how sophisticated the inference procedures are for manipulating the knowledge in a knowledge base, if the content of the knowledge base is poor then the inferences will be correspondingly poor.”

3.4) Configuring an Appropriate DSS

This subsection configures an appropriate DSS in light of the literature review and uses the result to confirm the suitability of a DSS as the form of the artefact.

In addition to outlining the DSS field and its benefits, the literature review showed that DSSs take on various forms and are used in various different ways. The distinctions made in the literature review are used to configure an appropriate DSS that the artefact can be built around. The resulting DSS configuration is then used to confirm whether a DSS is able to meet the artefact design requirements. On a high level a DSS was found to be a suitable vehicle for helping users to make decisions by processing knowledge or insights, as is required in this instance.

3.4.1) DSS Configuration

This subsection configures a DSS for the current situation.

In order to configure a specific DSS, distinctions or specifications are made in terms of Subfields, Generic Types, Advisory vs. Expert Systems, and Components. The selection for each of these is discussed below.

3.4.1.1) Subfield Selection: Personal DSS

Personal Decision Support Systems (PDSS): "Usually small-scale systems that are developed for one manager, or a small number of independent managers, to support a decision task" (Arnott & Pervan, 2008, p. 657).

When the different DSS Subfields are considered (see literature review in Chapter 3.3.3.1) PDSS clearly stands out as the appropriate configuration. PDSS "remains the most used form of decision support" (Arnott D. , 2008, p. 127) and "users are normally senior or middle-level managers" or "business analysts that support these managers" (Arnott D. , 2008, p. 131). This corresponds well with the individuals who should be driving and guiding the design of employee incentives.

3.4.1.2) Generic Type Selection: Knowledge-Driven DSS

Knowledge-Driven DSS (Primary): "Knowledge-driven DSSs can suggest or recommend actions to managers. These DSSs are person-computer systems with specialized problem-solving expertise. The expertise consists of knowledge about a particular domain, understanding of problems within that domain, and skill at solving some of these problems" (Power D. J., 2008, p. 131).

Model-Driven DSS (supplementary): "Model-driven DSSs emphasize access to and manipulation of financial, optimization, and/or simulation models. Simple quantitative models provide the most elementary level of functionality. Model-driven DSSs use limited data and parameters provided by decision-makers to aid decision-makers in analyzing a situation, but in general large data bases are not needed for model-driven DSSs" (Power D. J., 2008, p. 126).

The generic types are based on the dominant technology component or driver of the DSS. The Knowledge-Driven DSS stands out as the most appropriate type, yet the Model-Driven DSS has some relevance as well. This is not peculiar as it has been noted that some DSSs are hybrid systems; systems with more than one dominant component or driver. In this case the most appropriate type of DSS would be a Knowledge-Driven DSS that incorporates some characteristics of a Model-Driven DSS. This corresponds with the DSS Framework in Figure 3-2:

- The dominant DSS component is certainly the Knowledge Base, yet models are used to convey and organise the knowledge into a usable form.
- The purpose is certainly managerial advice, yet models are designed to support specific decision analysis.

It can further be noted that the users, purpose, and deployment technology for the Knowledge-Driven and Model-Driven DSS align very well with PDSS.

When the definition of Knowledge-Based DSSs are considered it is apparent that the type of DSS is well suited to situations where problems are complex and simple quantitative answers are unlikely to be accurate. Fittingly person-computer systems are called for in order to merge domain knowledge with an understanding of a specific setting to solve problems. The setting and use of a Knowledge-Based DSS calls for some of the characteristics typically found in a Model-Driven DSS in terms of optimisation models, and aiding decision-makers in analysing situations.

3.4.1.3) Advisory or Expert System?

Advisory System: “Advisory systems do not make decisions but rather help guide the decision-maker in the decision-making process, while leaving the final decision-making authority up to the human user” as opposed to Expert Systems which “are typically autonomous problem-solving systems used in situations where there is a well-defined problem and expertise needs to be applied to find the appropriate solution” (Beemer & Gregg, 2008, p. 511).

As per the definition above less well-defined problems are better addressed by Advisory Systems. While it is apparent that the DSS is to be an Advisory System it is helpful to keep this in mind during the design: “the suggestions made by advisory systems do not always represent the final answer to the problem. Instead, they represent advice used by the decision-maker as a part of the iterative problem-solving process” (Beemer & Gregg, 2008, p. 518).

3.4.1.4) DSS Component Specifications

The components of DSSs have been specified in the literature review as a Knowledge Base, a Model Base, and User Interface. It is thus not necessary to make a selection; a description of how each of the elements would look in this artefact can be found in the next subsection (Chapter 3.5.2) where the form of the artefact is discussed.

3.4.2) Verifying Suitability

This subsection verifies whether the configured DSS is appropriate.

At face value the DSS configuration specified above seems like it would be able to meet the design requirements. On a high level the artefact has to be able to help users to make decisions by processing various insights; a DSS is a suitable vehicle to help users with making decisions. A brief commentary is given in relation to the required practical functions and design specifications listed in Chapter 3.2.4:

1-10) The DSS can inform or instruct users on any information or concepts by including it in its Knowledge Base and communicating it via the Model Base and User Interface.
11) The DSS can be designed to be reliable if the quality of the Knowledge Base, and the interpretation via the models, is sound.
12) The DSS can be designed so that it is easy to use through developing the required User Interface.
13) The DSS can be designed so that it provides detailed information when required, through giving users access to the models and Knowledge Base.
14) The DSS can be designed to be suitable for use in organisations if the Knowledge Base is appropriate.

While the specified DSS is thus a suitable vehicle for designing an artefact that meets the requirements, it will have to be determined whether the requirements have been met once the artefact has been developed.

Further appropriate traits of the configured DSS include:
- ✓ aimed at complex, less well-structured problems;
- ✓ appropriate for use by middle and upper management;
- ✓ typically flexible;
- ✓ benefits wider than better decisions and better decision processes;
- ✓ typically evolves through an iterative process.

3.4.3) Final DSS Configuration

This subsection summarises the appropriate DSS configuration.

The final configuration that the artefact will be built on can be summarised as follows:
- A knowledge-driven personal Decision Support System that acts in an advisory capacity and is composed of a Knowledge Base, Model Base, and User Interface.

3.5) The Final Form of the DSS

This subsection specifies the final form of the artefact.

The final form of the artefact is dictated by the selection of the DSS as a suitable vehicle or framework. While the DSS configuration in the previous subsection provides some outlines of what the artefact will look like, specifics are still to be determined, especially in terms of the three DSS components. The conceptual and physical form of the final artefact is specified below.

3.5.1) Conceptual Form of Final Artefact

This subsection summarises the characteristics of the final artefact.

On a high level the artefact will have a certain approach. This is guided by the research questions, problem statement, and design specifications, and uses the specified DSS configuration as a vehicle. The resulting characteristics are as follows:

- The artefact aims to support and improve managerial decision-making, as is typical for DSSs. Decision-making is improved by:
    - Making users aware of the important considerations.
    - Making users aware of how the important considerations can be influenced.
    - Helping users to anticipate how influencing the important considerations with various mechanisms affects the overall system.
    - Helping users to understand which mechanisms should be employed or modified in what conditions.
- The artefact is specifically designed for one manager, or a small group of managers, as is typical for PDSS.
- The artefact is knowledge driven, and makes use of models to apply the knowledge.
- The artefact is advisory in the sense that it does not make decisions but guides the decision-maker.

3.5.2) Physical Form of Final Artefact

This subsection describes the physical form of the final artefact.

In terms of the physical form of the artefact a DSS has three components. Each of these components is described in some detail in this subsection.

Note that this subsection is written in light of the findings in the structured literature review (See Chapter 2.3 and Chapter 5).

3.5.2.1) The Knowledge Base - The knowledge that the DSS utilises to solve problems

The Knowledge Base (KB) is a crucial component of a DSS, and even more so for a knowledge-based DSS. The quality of the overall system is heavily dependent on the effectiveness of knowledge acquisition. It is important to note that “the measure of effectiveness lies in the structure and quality of the encoded knowledge, not the quantity” (Beemer & Gregg, 2008, p. 518). This supplements the justification and need for the extensive systematic literature review that was conducted to identify the 13 PICs. The 13 PICs meet the above criteria and accordingly serve as the cornerstone or backbone of the Knowledge Base. The Knowledge Base is expanded as required to provide the knowledge/information/intelligence (see Figure 1-4) that the models are to be built upon. Expanding the Knowledge Base beyond the 13 PICs involves: Identifying and describing the available Incentive Mechanisms (IMs) and Elements of Job Design (EJD); identifying and describing the links between the PICs, between the PICs and IMs, between the PICs and EJD, and between the IMs and EJD. The Knowledge Base is illustrated in Figure 3-3:

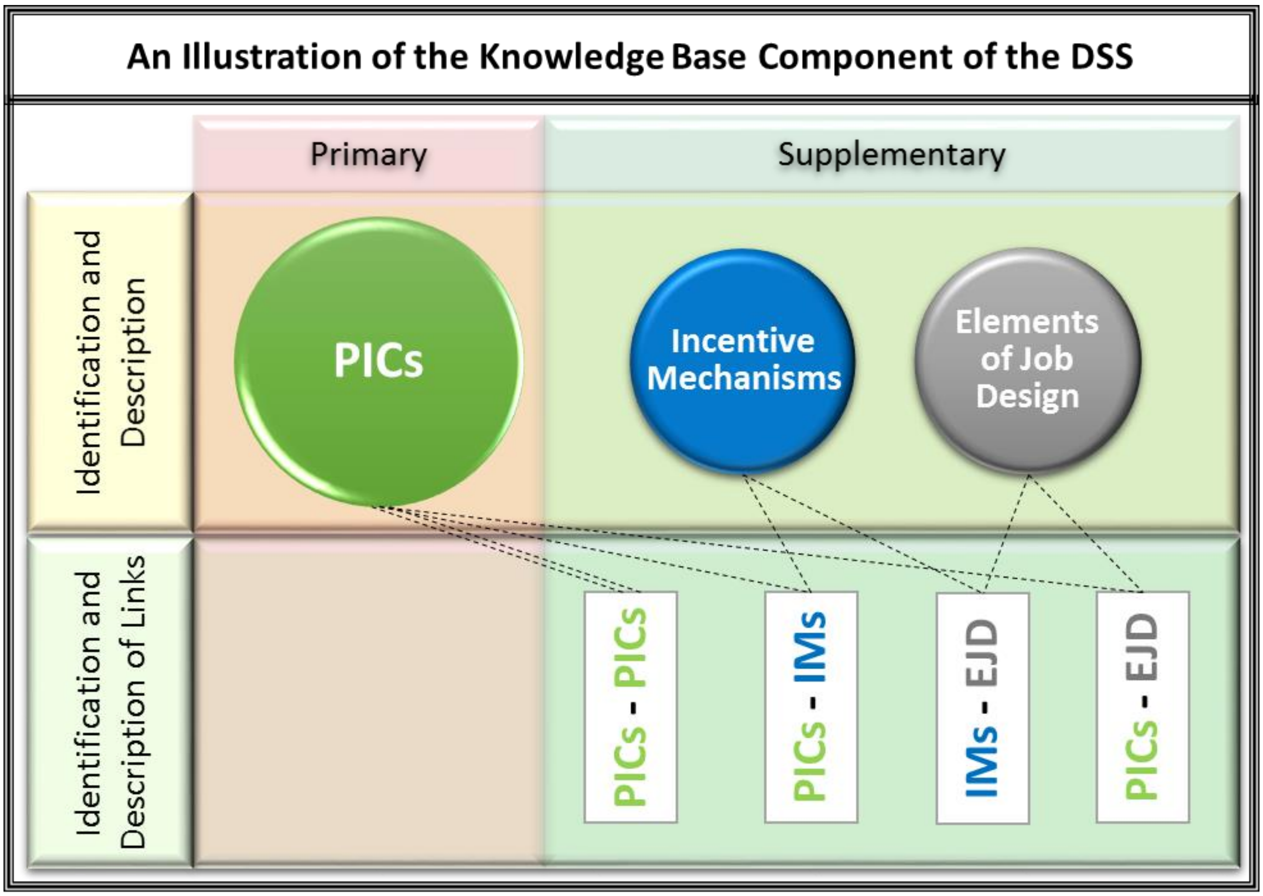


Figure 3-3: An illustration of the seven major segments of the Knowledge Base component of the DSS

The PICs are classified as the primary elements of the Knowledge Base, not because they are sufficient by themselves, but because they are the driving force behind the artefact. The PICs are a unique construct, the IMs and EJD are simply a collection of accepted tools that are to be used to influence the PICs.

3.5.2.2) The Model Base - The models that the DSS employs to make sense of the Knowledge Base

The Model Base (MB) analyses the information in the Knowledge Base and structures it in such a way that it can support decision-makers. The usefulness of the information or knowledge is thus enhanced in such a way that users can use it to gain insights to make decisions (see Figure 1-4). This requires an overarching model that incorporates all the information into one interconnected model, and various sub-models that organises each of the sets of links. Physically this is achieved by:

- an Integrated Links Model (ILM) that ties all the relevant links to each specific PIC;
- a range of link models that feeds the ILM and can be consulted for a detailed analysis;
  - A model containing the links between PICs
  - A model containing the links between PICs and IMs; this includes:
    - A model containing the links between the primary IMs and PICs
    - A model containing the links between the Features of Incentive Mechanisms (FIMs) and PICs
    - A model containing the links between the FIMs and IMs
  - A model containing the links between PICs and EJD
  - A model containing the links between IMs and EJD

The line between the Knowledge Base and the Model Base does become somewhat indistinct. This is to be expected as the Model Base contains the Knowledge Base, and the Knowledge Base is expanded as required by the Model Base.

3.5.2.3) The User Interface - The interface that the user utilises to interact with the Model Base and Knowledge Base

The User Interface (UI) represents the Model Base and Knowledge Base in such a way that user's decision-making is supported. The data/information/insights are presented in a way that allows judgements/decisions to be made easily as possible (see Figure 1-4). While the aim is not to develop a fully mature computerised package, the artefact will contain some elements that users can utilise to enjoy the benefits of the DSS. The User Interface will include:

- a representation of the Integrated Links Model in such a way that the primary links for each PIC are readily displayed. This interconnected web can be followed to discern secondary links;
- a support system that highlights the opportunities and dangers of using specific IMs;
- a detailed reference system that can be used to follow and access any series of links via the Model Base to the Knowledge Base.

The User Interface section (specifically Chapter 16) discusses how the rudimentary interface can be improved when a mature DSS is developed.

3.6) Summary

This subsection concludes Chapter 3: The Decision Support System.

A Decision Support System (DSS) was identified as an appropriate form for the artefact.

The purpose and primary function of the DSS is to help users to apply Incentive Mechanisms correctly and efficiently, by helping them to make the correct design decisions based on the information extracted from the systematic literature review. Decision-making can be improved in terms of quality and speed. The DSS does not address the entire process surrounding the implementation of incentive plans, but only the design or development considerations in terms of employee motivation and incentive considerations. Socio-political or legal considerations are not addressed.

The final form of the artefact is specifically a knowledge-driven personal Decision Support System that acts in an advisory capacity and is composed of a Knowledge Base, Model Base, and User Interface.

Chapter 4: Solution Objectives

"I am looking for a lot of men who have an

infinite capacity to not know what can't be done."

-Henry Ford

4.1) Introduction

This subsection introduces Chapter 4: Solution Objectives.

Chapter 4 defines the solution objectives in light of the problem statement and parameters discussed in SECTION A. Technical, functional, and scenario-based specifications are considered and combined into compound specifications. Research objectives and specifications are aligned, and the limitations of the research are noted. This chapter is structured as follows:

- Chapter 4.1) Introduction
- Chapter 4.2) Specifications
  - The technical, functional, and scenario-based specifications are identified. These are used to deduce the compound specifications.
- Chapter 4.3) Research Objectives
  - The alignment of the specifications and research objectives are discussed.
- Chapter 4.4) Limitations
  - The limitations of the research are discussed.
- Chapter 4.5) Summary

4.2) Specifications

This subsection identifies the technical, functional, and scenario-based specifications. These are used to deduce the compound specifications.

The solution objectives are inferred from the problem statement. In order to ensure and illustrate that this was done rationally a structured approach is followed. Technical specifications, functional specifications, and scenario-based specifications were considered and combined into compound requirements. These compound requirements were then translated into solution objectives as outlined by (Miedema, van der Voort, Lutters, & van Houten, 2007).

Pragmatism has been identified as the research paradigm for this study. Recall that ontologically pragmatism is concerned with knowledge for action and change (Goldkuhl G. , 2012), this is to say that reality is constituted by actions and the changes that occur as a result of these actions. This research paradigm naturally leads to the requirement that the research must produce an artefact created to address a problem (Peffers, Tuunanen, Rothenberger, & Chatterjee, 2008, p. 49). This led to the selection of a Decision Support System (DSS) as a suitable type of artefact. A DSS consists of a Knowledge Base (KB), Model Base (MB), and User Interface (UI). There is a useful correlation between the KB, MB, and UI and technical specifications, functional specifications, and scenario-based specifications. This is discussed alongside the identification of the various types of requirements. It must also be noted that the research specifications that follow are not in their initial form, but in their final form. The iterations that describe the development of the research specifications are not recorded.

4.2.1) Requirement Specifications

This subsection discusses the three types of requirement specifications individually.

4.2.1.1) Functional Specifications – What the Artefact Does

"Functional specifications provide a description of desired future product behaviour" and generally express concrete demands to abstract product models (Miedema, van der Voort, Lutters, & van Houten, 2007, p. 238). The functional specifications of an artefact, a sports watch for example, could include providing users with real-time performance metrics, an unobtrusive and comfortable fit, and providing users with detailed information for post-event analysis.

The functional requirements for this study can be summarised as follows:

- The artefact must function as a DSS.

This is a reaction to the primary research question: How can organisations utilise the literature on incentives, employee motivation, and job design to enhance organisational performance? A DSS helps organisations to utilise the relevant literature by synthesising it into a form where it is clear and easy to use. In essence a DSS helps users to make better decisions, and/or to make the decisions more efficiently (see Chapter 3). Note that the selection of this vehicle as the form of the artefact is the result of an iterative process that is not recorded here for brevity's sake. Iterations between functional, technical, and scenario- based specifications, coupled with an evolving knowledge of the problem, and iterations of prospective solutions, culminated in the selection of a DSS. This aligns well with pragmatism's focus on constructive knowledge, and the idea of learning by building.

The selection of a DSS prompts the design of three components, the KB, MB, and UI. The functional specifications for the artefact are entwined with the DSS requirements for the UI. It is clear that certain technical specifications must be satisfied to allow the artefact to enable users to make better and more efficient decisions. These technical specifications are discussed next.

4.2.1.2) Technical Specifications – How the Artefact Does It

"Technical specifications are complete and unequivocal expressions of product requirements" and generally express quantitative or easily quantifiable demands (Miedema, van der Voort, Lutters, & van Houten, 2007, p. 238). The technical specifications of an artefact, extending the example of a sports watch, could include weight, size, battery life, GPS capabilities, heart rate monitor, accelerometer, and strap material specifications.

The technical requirements for this study can be summarised as follows:

- The artefact must include a KB, MB, and UI.

A DSS consists of three components, the KB, MB, and UI. The technical specification of each of these components must be satisfied. A breakdown of what each of the components entails, and what the specifications are, can be found in the DSS literature review in Chapter 3. In short the specifications are:

- The KB must contain the knowledge that the DSS utilises to solve problems. This is one of the major challenges in the development of the DSS. It is achieved through a systematic literature review culminating in the 13 PICs, and extended to include the typical Incentive Mechanisms (IMs), and relevant Elements of Job Design (EJD). See SECTION B.
- The MB must contain the models that the DSS employs to make sense of the KB. The MB must analyse the information in the KB and structure it in such a way that it can support decision-making.
- The UI must provide the interface that the user utilises to interact with the MB and KB. Note that a mature UI is not required, the scope is limited to illustrating how a mature UI would look and demonstrating how it would be used.

Having specified 'what' and 'how', the 'where' is specified next.

4.2.1.3) Scenario-based Specifications – Where the Artefact Does It

"Product behaviour is indicated in terms of what the environment, e.g. the user, can do with a product and how it will interact as opposed to technical or functional specification where traditionally focus is placed on what the product will do and how it does it" (Miedema, van der Voort, Lutters, & van Houten, 2007, p. 239). The scenarios where an artefact may be required to be used, extending the example of a sports watch, could include running, mountaineering, or swimming.

The usage scenarios for this study is as follows:

- The artefact is to be used in relation to improving an organisation's practices regarding employee incentives.

The scenario that the DSS is to be used in is derived from the extended problem statement discussed in Chapter 1.4.

4.2.2) Compound Specifications

This subsection considers the three types of requirement specifications in relation to each other.

The three individual specifications can be considered in relation to each other to ascertain the appropriate solution space. These three new compound perspectives can then be considered together to form a holistic picture of the solution requirements. This is illustrated in Figure 4-1:

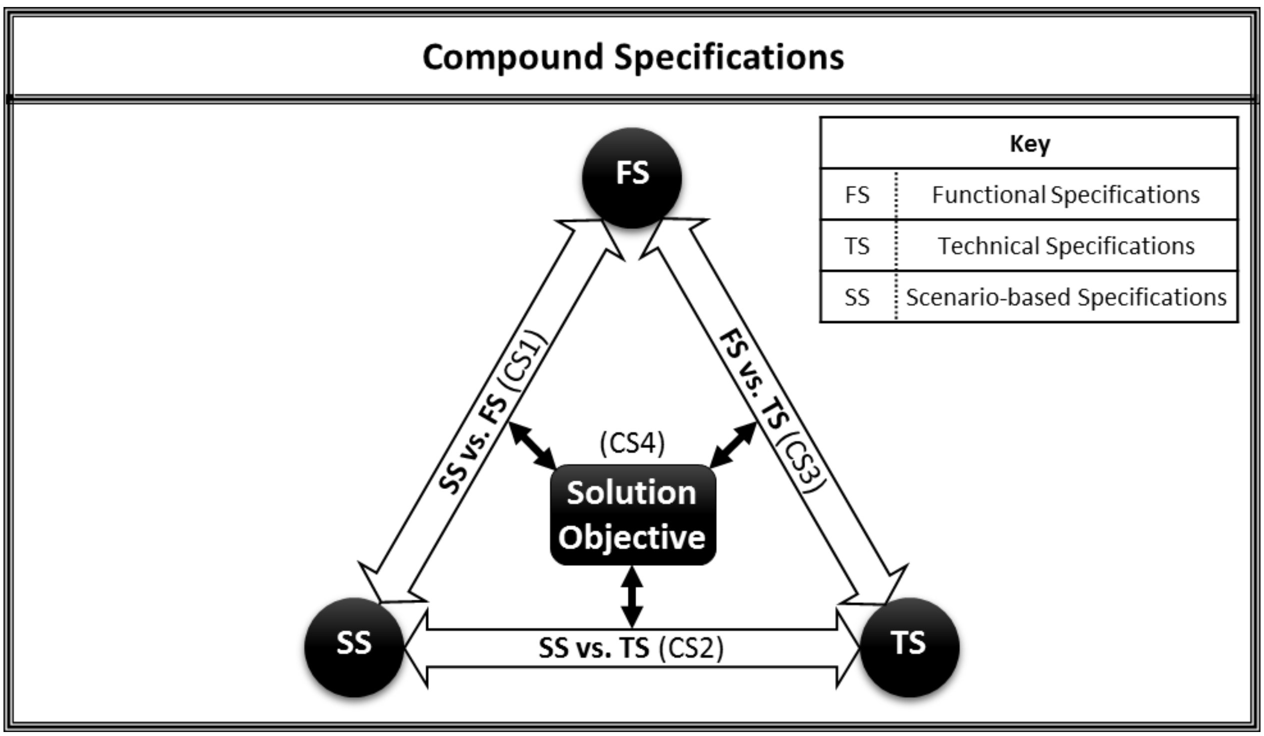


Figure 4-1: Compound perspectives towards a solution objective

4.2.2.1) Functional specifications vs. Scenario-based specifications (CS1)

When the functional specifications and scenario-based specifications are considered together, the artefact's desired behaviour in a certain scenario is highlighted. Continuing with the sports watch example, for a runner, easy-to-read real-time performance metrics are important. A mountaineer would be less concerned with the ease of use, and be willing to trade that in for more detailed navigational information.

The functional and scenario-based specifications for this artefact can be summarised as follows:

- Functional specifications: The artefact must function as a DSS.
- Scenario based specifications: The artefact is to be used in relation to improving an organisation's practices regarding employee incentives.

This perspective does not consider the technical specifications. It considers the artefact's desired behaviour in a certain context, hence highlighting that the artefact must help users with their decision-making in the context of improving an organisation's practices regarding employee incentives. This compound specification is thus:

- Compound Specification (CS1): The artefact must function as a DSS in relation to improving an organisation's practices regarding employee incentives.

4.2.2.2) Technical specification vs. Scenario-based specifications (CS2)

When the technical specifications and scenario-based specifications are considered together the artefact's physical requirements in a certain scenario are highlighted. The runner would not be concerned with extensive battery life and would prefer extra sensors such as a heart rate monitor. The mountaineer on the other hand would be very concerned with battery life while not being overconcerned with additional vital sign sensors.

The technical and scenario-based specification for this artefact can be summarised as follows:

- Technical specifications: The artefact must include a KB, MB, and UI.
- Scenario based specifications: The artefact is to be used in relation to improving an organisation's practices regarding employee incentives.

This perspective does not consider the functional specifications. It considers the artefact's required characteristics in a certain context, hence highlighting that the artefact must include a KB, MB, and UI, in the context of improving an organisation's practices regarding employee incentives. This compound specification is thus:

- Compound Specification (CS2): The artefact must include a KB, MB, and UI, in the context of improving an organisation's practices regarding employee incentives.

4.2.2.3) Functional specifications vs. Technical specifications (CS3)

When the technical specifications and functional specifications are considered together the artefact's physical requirements needed to allow the desired functionality is highlighted. A watch that needs to be able to monitor an athlete's heart rate for a certain period of time needs to be fitted with a heart rate monitor and a battery that can power the device for the required time period.

The functional and technical specifications for this artefact can be summarised as follows:

- Functional specifications: The artefact must function as a DSS.
- Technical specifications: The artefact must include a KB, MB, and UI.

This perspective does not consider the scenario-based specifications. It considers the artefact's required characteristics in light of a desired behaviour or function, hence highlighting that the artefact must include a KB, MB, and UI, in order to fulfil its function as a DSS. This compound specification is thus:

- Compound Specification (CS3): The artefact must function as a DSS and consist of a KB, MB, and UI.

4.2.2.4) Functional specifications vs. Technical specification vs. Scenario-based specifications (CS4)

When the perspectives are weighted together the solution objective emerges from a functional, technical, and scenario-based point of view. With the example of the sports watch for runners the design should therefore ensure that various real-time performance metrics are available on a device that is easy to use and not obtrusive through its use of materials, dimensions, sensors, and interface. A different solution would be required for mountaineering as the setting emphasises different functions which will require different physical components.

The functional, technical, and scenario based specifications for this artefact can be summarised as follows:

- Functional specifications: The artefact must function as a DSS.
- Technical specifications: The artefact must include a KB, MB, and UI.
- Scenario based specifications: The artefact is to be used in relation to improving an organisation's practices regarding employee incentives.

This perspective now includes the functional, technical, and scenario-based specifications providing a holistic view of the requirements. The final compound specification is construed to be:

- Compound Specification (CS4): The artefact must function as a DSS, consisting of a KB, MB, and UI, that can be used to improve an organisation's practices regarding employee incentives.

4.3) Research Objectives

This subsection discusses how the specifications and research objectives are aligned.

4.3.1) Specifications - Primary Objective

The final compound specification, CS4, drives the primary objective of this research. Note that the primary objective is somewhat more succinct than CS4:

- Primary Objective: Develop a Decision Support System that can be used to improve an organisation's employee incentives practices.

This is as a result of the meaning encapsulated by the term "Decision Support System" or DSS. A DSS is commonly understood to serve a specific function as explained in Chapter 3, and the design of a DSS is understood to have certain components, as described in Chapter 3.3.3.4 and Chapter 3.5.2 specifically, which translates to the technical specifications.

When the primary objective is broken down it can thus be seen that the content encapsulates the approach suggested by Miedema et al. (2007). The functional and technical specifications are captured in the term 'DSS', with the scenario-based specification detailed thereafter. The harmony between the different types of specifications is controlled for independently, in pairs, and holistically.

4.3.2) Secondary Objectives

This chapter has defined the primary objective by considering the high-level specifications. Note that no secondary objectives or specifications are articulated at this stage. The secondary objectives arise from the process that is required to build the specified artefact. They could be construed as:

- developing the Knowledge Base (KB) as required for the DSS;
- developing the Model Base (MB) as required for the DSS;
- designing the User Interface (UI) as required for the DSS.

Alternatively, secondary objectives could be seen as the function or content required for the KB, MB, and UI – these three then become the needed components of the solution required to satisfy the primary objective.

4.4) Limitations

This subsection discusses the limitations of the research.

Various notable limitations exist due to the nature of the artefact. If a user misunderstands what the artefact addresses and encompasses, certain processes and considerations will be compromised. In this regard it is necessary to maintain a clear picture of the function and position of the artefact in the overall process involved with the implementation of an incentive plan (see Figure 3-1 specifically). The artefact is not intended to replace existing tools and guidelines, but accompanies them in the area of design considerations specifically; the 13 PICs focus on incentive plan design considerations from a moral-hazard/employee-motivation/goal-alignment/incentive-mechanisms/job-design point of view. In addition to this the artefact functions as an advisory system; advisory systems do not make decisions but rather help guide the decision-maker in the decision-making process, while leaving the final decision-making authority up to the human user. The artefact is built on principles, and not moulded to a specific country, industry, or type of employee. The following limitations are thus to be kept in mind:

- **Decision 'Support'**: The artefact is not able to make concrete decisions for users. Instead it helps users in the decision-making process by making them aware of the Primary Incentive plan design Considerations (PICs) as found in Chapter 5 and Appendix A.1, and by helping them to understand how the PICs are related to each other, and the typical Incentive Mechanisms and Job Design.
- **Strategy**: The artefact is not tailored to help users formulate the required business strategies that are necessary to determine the objectives of an incentive plan. See Figure 3-1.
- **Implementation**: The artefact is not tailored to assist user with implementation, monitoring, or adjustment steps. See Figure 3-1.
- **Legal and Socio-political Considerations**: The artefact is built on motivation and incentive principles; it is not able to provide for legal or socio-political considerations.
- **Specifics**: As the artefact is built on principles, it is not tailored to address specific employees, industries, legal systems, or socio-political environments.

4.5) Summary

This subsection concludes Chapter 4: Solution Objectives

The functional, technical, and scenario-based specifications were considered in relation to each other to yield the compound specification:

- The artefact must function as a DSS, consisting of a KB, MB, and UI, that can be used to improve an organisation’s practices regarding employee incentives.

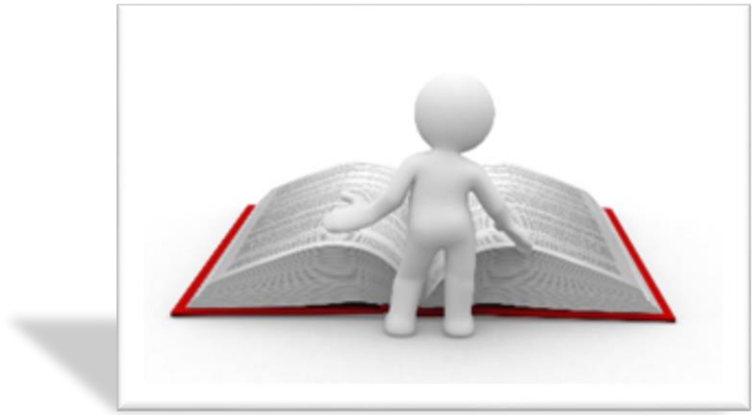
This compound specification aligns with the primary research objective:

- Develop a Decision Support System that can be used to improve an organisation’s employee incentives practices.

This is as a result of the meaning encapsulated by the term 'Decision Support System' or DSS. A DSS is commonly understood to serve a specific function as explained in Chapter 3, and the design of a DSS is understood to have certain components, as described in Chapter 3.3.3.4 and Chapter 3.5.2 specifically, which translates to the technical specifications.

The Artefact is not intended to be used as a stand-alone tool, but in conjunction with existing tools, guidelines, practices, procedures, and/or models. The following limitations are thus to be kept in mind:

- Decision ‘Support’: The artefact is not able to make concrete decisions for users. Instead it helps users in the decision-making process by making them aware, and helping them to understand, the Primary Incentive plan design Considerations as found in Chapter 5 and Appendix A.1.
- Strategy: The artefact is not focused on helping users formulate the required business strategies that are required to determine the objectives of an incentive plan. See Figure 3-1.
- Implementation: The artefact is not geared to assist users with implementation, monitoring, or adjustment steps. See Figure 3-1.
- Legal and Socio-Political Considerations: The artefact in built on motivation and incentive principles, it is not able to provide for legal or socio-political considerations.
- Specifics: As the artefact is built on principles, it is not tailored to address specific employees, industries, legal systems, or socio-political environments.



SECTION B: KNOWLEDGE BASE (KB)

Chapter 5 to Chapter 7 identify the core components of the Knowledge Base (KB) that the DSS is built upon. The KB is a crucial component of the DSS. It follows that an extensive systematic literature review was conducted to identify the 13 PICs. In addition to the 13 PICs, which lie at the heart of the KB, the typical Incentive Mechanisms (IMs) and Elements of Job Design (EJD) had to be identified as well. The need to consider the EJD arose from the structured literature review, and the PICs needed to be considered in conjunction with the IMs. The processes followed in this section can be repeated at any time to reflect prospective developments in the theoretical landscape regarding employee incentives and motivation.

SECTION B[2] proceeds as follows:

- Chapter 5 identifies the **PICs According to a Structured Literature Review[3]**.
- Chapter 6 identifies the relevant **Incentive Mechanisms**.
- Chapter 7 identifies the **Elements of Job Design**.

[2] It must be noted that it is difficult to make a clear distinction between the KB and the MB. As illustrated in Figure 3-3, the complete KB could be said to contain the PICs, IMs, and EJD, as well as the links between the PICs themselves, between the PICs and IMs, between the PICs and EJD, and between the IMs and EJD. SECTION B identifies the PICs, IMs, and EJD, but the links are provided in SECTION C alongside the relevant link models.

[3] The structured literature review recorded in Chapter 5 produced an article that was published prior to the final compilation of this dissertation:

❖ Loots, E., & Schutte, C. S. (2016). Primary incentive plan design considerations according to a review of key influential works. *Engineering Management Journal, 28*(4), 224-237.

Chapter 5: PICs According to a Structured Literature Review

"As the economy of incentives as a whole in terms of organization is not usually stressed in economic theory and is certainly not well understood, I shall attempt to indicate the outlines of the theory."

-Chester Barnard 1938

5.1) Introduction

*This subsection introduces **Chapter 5**: PICs According to a Structured Literature Review.*

The DSS and the Primary Incentive plan design Considerations (PICs) are specifically concerned with the development or design of an incentive plan. Design considerations related to incentives and motivation are thus the focus of the PICs. The PICs do not aim to provide guidance with organisational strategy or implementation procedures, and do not address legislative or socio-economic considerations. This is in line with the gap in the literature (see Chapter 1.4) that the research seeks to address. The DSS is not intended to be used as a stand-alone tool, but in conjunction with existing tools, guidelines, practices, procedures, and/or models.

Chapter 5 identifies the PICs through a structured literature review process. After outlining the need for a structured approach the Key Influential Works (KIWs) in the relevant domain were identified. The PICs were extracted from the KIWs. A detailed description is provided for each PIC. This chapter is structured as follows:

- Chapter 5.1) Introduction
- Chapter 5.2) Methodology
    - The need for a structured literature review is outlined and an overview of the process involved with the structured literature review is provided.
- Chapter 5.3) Identification of Key Influential Works (KIWs)
    - An overview of the process required to identify the Key Influential Works is provided.
- Chapter 5.4) Extracting the PICs from the Key Influential Works (KIWs)
    - An overview of the process required to extract the PICs from the Key Influential Works is provided. The findings are processed and compared with the findings of an initial ad hoc investigation.
- Chapter 5.5) An Overview of the PICs (as Listed and Described in Appendix A.1)
    - An overview of the PICs and of the descriptive list of PICs is provided.
- Chapter 5.6) Summary and Conclusion

5.2) Methodology

This subsection outlines the need for a structured literature review and provides an overview of the process involved with the structured literature review.

5.2.1) The Need for a Structured Literature Review (Figure 5-1 – A1)

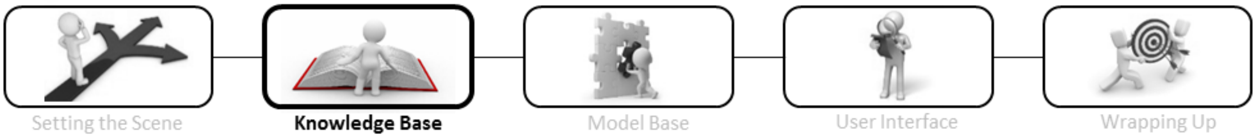
This subsection outlines the need for a structured literature review.

It has been discussed that the literature on incentives and motivation is extensive and integrates knowledge from a variety of disciplines such as economics, management, organisational theory, psychology, finance, and human resources. In addition to the width and breath of the literature there are different schools of thought that often seem, and sometimes are, contradictory. Different disciplines and schools of thought emphasise different aspects. While a heuristic literature review is able to identify substantial quantities of data, it is possible for a researcher to get streamlined into certain schools of thought. It is thus imperative that a holistic and objective overview of the body of knowledge is obtained. As opposed to a heuristic approach, a systematic review uses an explicit algorithm to identify and select works of literature (Crossnan & Apaydin, 2010). A structured literature review was hence selected as the appropriate research method to construct the Knowledge Base (KB).

5.2.2) The Structured Literature Review Process

This subsection provides an overview of the process involved with the structured literature review.

As per the need for a structured literature review noted above a positivist approach was taken. A deductive investigation was thus undertaken in as objective a manner as possible. This study reviews the existing literature regarding the provision of employee incentives and extracts the primary considerations that have to be taken into account when designing or reviewing incentive plans. The structured literature review had two major investigative steps. The Key Influential Works (KIWs) in the domain were identified from the various disciplines to allow for the extraction of the most important considerations incentive plan designers have to take into account. This was followed by an analysis of the findings. An overview of the process is shown in Figure 5-1:



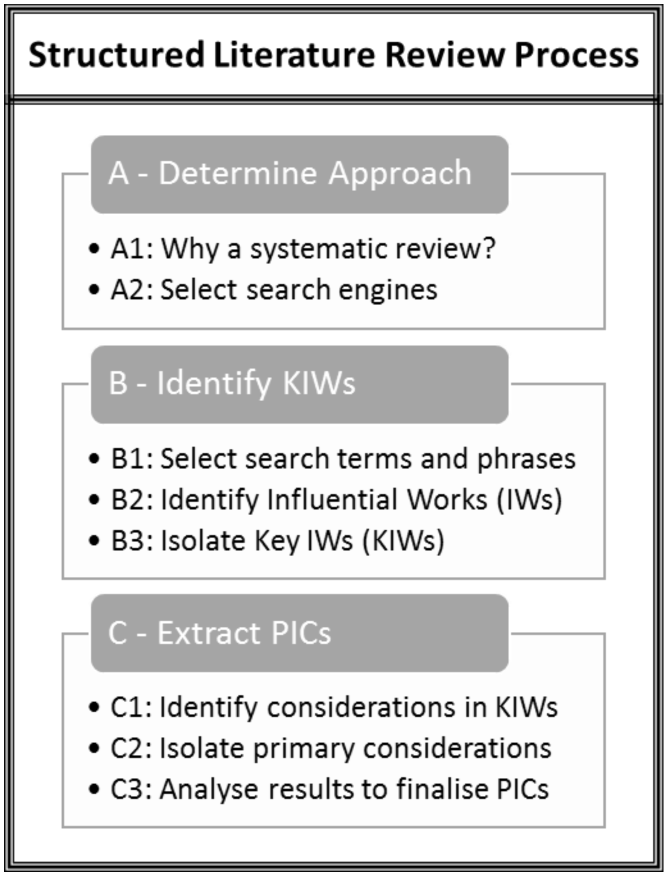


Figure 5-1: An overview of the process followed by the structured literature review

5.2.2.1) Challenges and Limitations

Some of the typical challenges faced by systematic reviews include; difficulty of data synthesis from various disciplines, insufficient representation of books, and large amounts of material to review (Pittaway, Robertson, Munir, Denyer, & Neely, 2004). While not a perfect tool, Google Scholar is great for cross-discipline searches (Google Scholar is reviewed below). This review is limited to peer-reviewed journals as these can be considered validated knowledge and are likely to have the highest impact in the field (Podsakoff P. M., MacKenzie, Bacharach, & Podsakoff, 2005). There was, however, no way to get around the fact that a large amount of material had to be reviewed.

5.2.2.2) Search Engines (Figure 5-1 – A2)

Google Scholar was chosen as the primary search engine and was used in conjunction with ISI Web of Science (WoS). Whilst Google Scholar is not flawless, it has come to be recognised as a reliable research tool with some researchers positing that Google Scholar might provide a less biased comparison across disciplines than the Web of Science (Harzing, 2012). Retrospectively, the citation count in Google Scholar for the 59 papers identified as Influential Works (see Chapter 5.3.2 and Table 1-1 specifically) is compared to the citation count for the same papers in the WoS. In this case it was found that Google Scholar returned considerably more citations than the WoS, in total 3.9 times more. Figure 5-2 shows that, while the magnitudes differ when comparing the Google Scholar Citations to the Web of Science Citations, the relative importance or citation frequency of individual papers between the different search engines is similar when comparing the Google Scholar Citations to the Scaled WoS citations. These results suggest that Google Scholar results are more comprehensive than WoS results yet they reflect the relative importance of papers. Minor differences are not an issue as results from Google Scholar and WoS are used in conjunction with other metrics to determine the relative importance of each paper as outlined in Chapter 5.3.3.

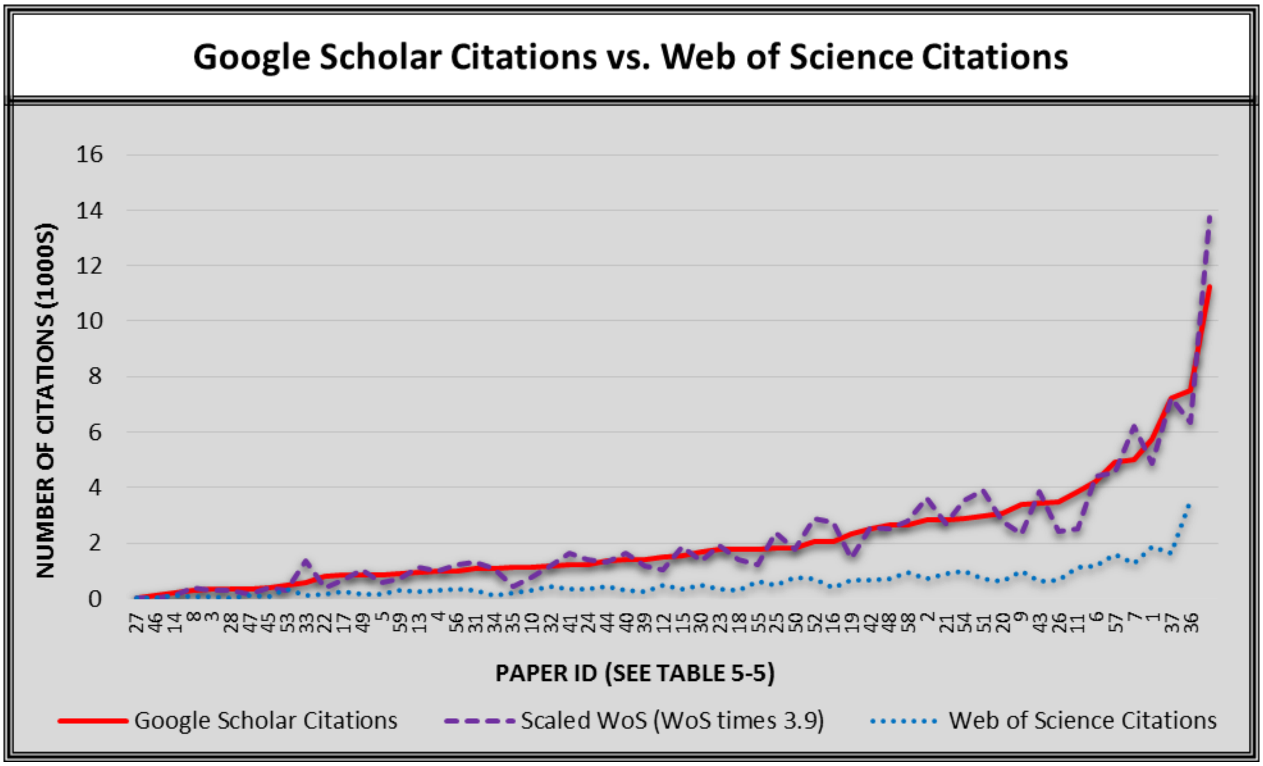


Figure 5-2: A comparison of the number of citations for influential papers according to Google Scholar and Web of Science

5.3) Identification of Key Influential Works (KIWs)

This subsection provides an overview of the process required to identify the Key Influential Works.

In order to objectively and holistically identify the Key Influential Works (KIWs) a structured process was followed as outlined in Figure 5-1. This process started by casting a wide net to identify the Influential Works (IWs) in the domain before analysing the IWs to obtain the KIWs. Note that a similar process was followed during the research proposal, but whilst this is not included in the documentation for brevity's sake, the results are compared where appropriate to illustrate the reliability of the findings.

5.3.1) Select Search Terms and Phrases (Figure 5-1 – B1)

This subsection selects the terms and phrases that are used in the search engines.

> *"All our work, our whole life is a matter of semantics, because words are the tools with which we work, the material out of which laws are made, out of which the Constitution was written. Everything depends on our understanding of them."*
>
> *- Felix Frankfurter*

Ascertaining the terms and phrases that describe the domain this research is focused on is no trivial undertaking. This is due to the range of research fields that the information is sourced from. A familiarity with the jargon of various disciplines, as well as the definitions or meanings behind certain terms, is required. The sources and processes that were used to determine the relevant search terms are as follows:

- Influential literature surveys were examined for their use of terminology referring to incentives:
    - The Provision of Incentives in Firms (Prendergast, 1999).
    - Incentives in Organizations (Gibbons, 1998).
    - Incentives and Organizations in the Public Sector: An Interpretative Review (Dixit, 2002).
- Articles related to the Key Influential Works (KIWs), as identified by the research proposal, were examined. Google Scholar was used.
- Key words and tags used by the KIWs, as identified by the research proposal, were used to find related keywords or tags. Two databases were surveyed:
    - Web of Science by Thomson Reuters.
    - Mendeley by Elsevier.

The resulting terms and phrases are show on Table 5-1:

Table 5-1: Initial groupings of search terms and phrases from various sources

Cluster	Prendergast	Gibbons	Dixit	Google Scholar	Web of Science	Mendeley
A	-Incentives -Incentive contracts	-Incentives -Incentive contracts -Incentive pay	-Incentives -Theory of incentives	-Incentive contracts	-Incentives	-Incentives
B					-Contracts	-Contract theory -Contract
C	-Compensation			-Compensation -Remuneration	-Compensation -Pay	-Compensation
D	-Pay for performance	-Rewarding		-Performance related pay		-Pay for performance -Bonuses
E	-Agency theory	-Agency theory				-Agency theory
F				-Motivation	-Motivation	

The terms and phrases in Table 5-1 are arranged into six rows. Each row clusters terms or phrases addressing similar concepts together. The search parameters were extended to include:

- Singular and plural forms - Some terms are only in plural or singular form, both will be searched where applicable:
    - Incentives & Incentive
    - Contract & Contracts
    - Reward & Rewards (see ‘rewarding’ below)
    - Bonus & Bonuses
- Alternate phrase orders – Some terms can be phrased differently:
    - ‘Pay for Performance’ → ‘Performance Pay’
    - ‘Theory of Incentives’ → ‘Incentive Theory’
    - ‘Contract Theory’ → ‘Theory of Contracts’
- Synonyms – The relevant synonyms were, however, already present as one would expect. Examples are incentive/motivation and compensation/remuneration/pay.
- Phrase segments – As above the relevant examples were already decomposed. Examples are: ‘Incentive contracts’ → Incentives & Contracts; ‘Incentive Pay’ → Incentives and Pay; and ‘Contract Theory’ → Contract.
- Alternative word forms – Some words can be present in more than one form:
    - Incentives → Incentivising
    - Contracts → Contracting
    - Compensation → Compensating
    - Remuneration → Remunerating
    - Rewarding → Reward
    - Motivation → Motivating
- Alternative spelling – Some words are spelt differently (American vs. British English):

- Incentivising & Incentivizing

The above considerations add a number of items to search to the list. ‘Merit Pay’ is the only search term used during the research proposal that will not be used again. The complete list of instances that are to be searched is summarised in Table 5-2 below:

Table 5-2: Summary of search instances to be used in Google Scholar

Cluster A	Cluster B	Cluster C	Cluster D	Cluster E	Cluster F
Incentives	Contracts	Compensation	Pay for performance	Agency theory	Motivation
Incentive	Contract	Compensating	Performance Pay		Motivating
Incentivising	Contracting	Remuneration	Performance related pay		
Incentivizing	Incentive Contracts	Remunerating	Rewarding		
Theory of Incentives	Theory of Contracts	Pay	Rewards		
Incentive Theory	Contract Theory	Incentive Pay	Reward		
			Bonuses		
			Bonus		

This is a considerable extension to the list used in the research proposal that only looked at:

- Theory of Incentives
- Incentives
- Incentive
- Performance Pay
- Pay for Performance
- Merit Pay

5.3.2) Identify Influential Works (Figure 5-1 – B2)

This subsection lists the papers that are regarded as Influential Works.

A total of 59 research papers were categorised as Influential Works (IWs). In order to identify the IWs the 30 most relevant search results from Google Scholar for each of the 29 terms in Table 5-2 were taken into consideration. From these 870 relevant search results 45 papers were deemed to be IWs based on their relevance and number of citations. Out of these 45 papers, 20 were also identified during the research proposal, 11 were identified on an ad hoc basis since then, and 14 had not been considered before. Refer to Table 5-3 below for the details of the 45 papers identified as IWs during this step:

Table 5-3: The initial list of Influential Works

Date	Authors	Google Scholar Citations	Web of Science Citations	*	Title of Research Paper
2005	MB Rosenthal et. Al	568	353	P	Early experience with pay-for-performance
2003	LA Bebchuk & JM Fried	1499	270	N	Executive compensation as an agency problem
2002	CA Holt & SK Laury	2671	719	S	Risk aversion and incentive effects
2002	EA Locke & GP Latham	2989	995	P	Building a practically useful theory of goal setting and task motivation: A 35-year odyssey
2000	EP Lazear	1699	353	P	Performance pay and productivity
2000	RM Ryan & EL Deci	11225	3530	S	Self-determination theory and the facilitation of intrinsic motivation, social development, and well-being
1999	EL Deci, R Koestner, RM Ryan	3422	988	S	A meta-analytic review of experiments examining the effects of extrinsic rewards on intrinsic motivation
1999	B Holmström	2316	367	P	Managerial incentive problems: A dynamic perspective
1999	C Prendergast	2850	694	P	The provision of incentives in firms
1998	R Gibbons	892	179	S	Incentives in Organizations
1997	JA Chevalier & GD Ellison	1777	363	P	Risk Taking by Mutual Funds as a Response to Incentives
1996	R Eisenberger & J Cameron	848	270	N	Detrimental effects of reward: Reality or myth?
1995	RW Holthausen, DF Larcker & RG Sloan	871	144	N	Annual bonus schemes and the manipulation of earnings
1995	H Mehran	1789	318	N	Executive compensation structure, ownership, and firm performance
1994	J Cameron & WD Pierce	1098	274	S	Reinforcement, reward, and intrinsic motivation: A meta-analysis
1994	GP Baker, R Gibbons & KJ Murphy	1179	297	P	Subjective performance measures in optimal incentive contracts
1994	B Holmström & P Milgrom	1209	420	P	The firm as an incentive system
1993	A Kohn	805	104	S	Why Incentive plans cannot work
1992	GP Baker	985	249	P	Incentive contracts and performance measurement
1992	R Gibbons & KJ Murphy	1374	336	S	Optimal incentive contracts in the presence of career concerns: Theory and evidence
1991	B Holmström & P Milgrom	4933	1167	P	Multitask Principal-Agent Analyses: Incentive Contracts, Asset Ownership, and Job Design

Date	Authors	Google Scholar Citations	Web of Science Citations	*	Title of Research Paper
1990	MC Jensen & KJ Murphy	1123	116	P	CEO incentives: it's not how much you pay, but how
1990	MC Jensen & KJ Murphy	5728	1247	P	Performance pay and top-management incentives
1989	KM Eisenhardt	7509	1629	N	Agency theory: An assessment and review
1989	R Folger & MA Konovsky	2047	740	N	Effects of procedural and distributive justice on reactions to pay raise decisions
1988	GP Baker, MC Jensen & KJ Murphy	1839	459	P	Compensation and incentives: Practice vs. theory
1987	B Holmström & P Milgrom	2500	655	P	Aggregation and linearity in the provision of intertemporal incentives
1985	PM Healy	3371	599	S	The effect of bonus schemes on accounting decisions
1983	BJ Nalebuff & JE Stiglitz	1218	358	P	Prizes and incentives: towards a general theory of compensation and competition
1982	GA Akerlof	3071	718	N	Labor contracts as partial gift exchange
1981	EP Lazear, S Rosen	4203	1134	P	Rank-order tournaments as optimum labor contracts
1979	RB Meyerson	1830	614	P	Incentive compatibility and the bargaining problem
1979	B Holmström	7245	1860	P	Moral hazard and observability
1979	RM Townsend	2640	644	N	Optimal contracts and competitive markets with costly state verification
1979	M Harris & A Raviv	989	315	N	Optimal Incentive Contracts with Imperfect Information
1979	S Shavell	1539	484	N	Risk sharing and Incentives in the Principal agent relationship
1977	AL Kalleberg	1073	332	N	Work values and job rewards: A theory of job satisfaction
1977	SA Ross	3461	616	N	The determination of financial structure : the incentive-signalling approach
1976	JR Hackman & GR Oldham	5020	1597	S	Motivation through the Design of Work: Test of a Theory
1975	S Kerr	1383	417	S	On the folly of rewarding A, while hoping for B
1973	T Groves	2818	928	P	Incentives in Teams
1973	SA Ross	3837	648	N	The economic theory of agency: The principal's problem
1971	EL Deci	2870	911	S	Effects of externally mediated rewards on intrinsic motivation
1968	EA Locke	2062	706	P	Toward a theory of task motivation and incentives
1961	PB Clark & JQ Wilson	931	295	N	Incentive systems: A theory of organizations

* P = Also identified in research proposal, S = Discovered since research proposal, N = Not consulted before.

Virtually no research from the last ten years qualified as IWs. It could be that contemporary papers contribute to the domain, and have significant influence, but are eclipsed in search results due to the longer time that older papers have had to garner citations. It might also be argued that the Matthew Effect (cumulative advantage) gives earlier papers an advantage. In order to ensure that influential contemporary works are not missed the search was repeated twice; initially restricted to 2003–2013, and then restricted to 2008–2013. Twenty papers were considered for each search of the 29 terms. These searches revealed another ten and four papers respectively. Out of these 14 papers four were also identified during the research proposal, three were identified on an ad hoc basis since then, and seven had not been considered before. Refer to Table 5-4 below for the details of the 14 papers that were added to the IWs during this step:

Table 5-4: Contemporary papers added to Influential Works

Date	Authors	Google Scholar Citations	Web of Science Citations	*	Title of Research Paper
2011	R Fahlenbrach & RM Stulz	488	70	P	Bank CEO incentives and the credit crisis
2011	T Dohem & A Falk	361	35	P	Performance pay and multidimensional sorting: Productivity, preferences, and gender
2011	U Gneezy, S Meier & P Rey-Biel	184	33	N	When and why incentives (don't) work to modify behavior
2011	A Morse, V Nanda & A Seru	109	7	P	Are incentive contracts rigged by powerful CEOs?
2010	W Mason & DJ Watts	360	-	P	Financial incentives and the performance of crowds
2006	D Bergstresser & T Philippon	1128	195	N	CEO incentives and earnings management
2005	R Gibbons	341	81	N	Incentives between firms (and within)
2005	LA Bebchuk & JM Fried	303	-	N	Pay without Performance: Overview of the Issues
2005	SL Rynes, B Gerhart, L Parks	275	98	S	Personnel psychology: Performance evaluation and pay for performance
2005	M Gange & EL Deci	1774	485	S	Self-determination theory and work motivation
2004	P Oyer	396	95	N	Why do firms use incentives that have no incentive effects?
2003	R Benabou & J Tirole	1396	306	S	Intrinsic and extrinsic motivation
2003	J Levin	833	173	N	Relational incentive contracts
2003	W Bentley Macleod	322	72	N	Optimal Contracting with Subjective Evaluation

* P = Also identified in research proposal, S = Discovered since research proposal, N = Not consulted before.

Eight papers that the research proposal identified as IWs did not make the revised list. Out of the 59 papers regarded as IWs, 24 were also identified during the research proposal, 14 were identified on an ad hoc basis since then, and 21 had not been considered before. This is illustrated in Figure 5-3:

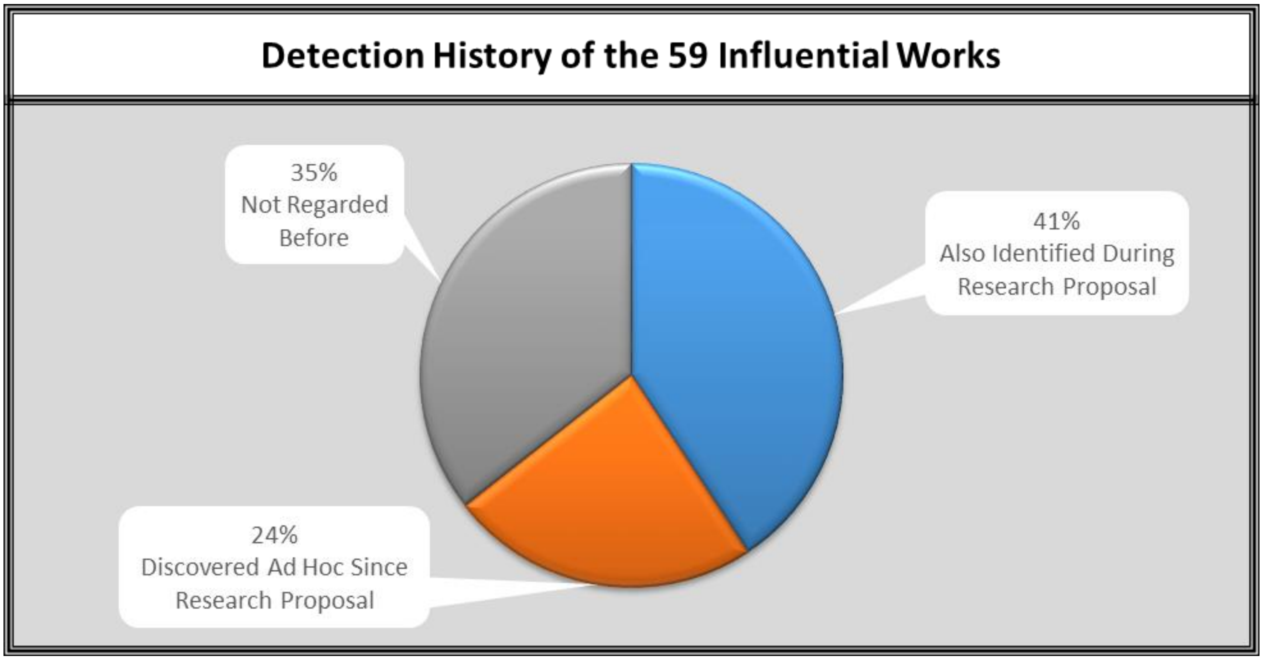


Figure 5-3: Detection history of Influential Works

5.3.3) Isolate Key Influential Works (Figure 5-1 – B3)

This subsection isolates the Key Influential Works from the Influential Works.

Isolating the Key Influential Works (KIWs) from the Influential Works (IWs) presents a challenge as the number of citations shown on Table 5-3 and Table 5-4 do not provide a holistic representation of the ranking of influential papers. Various other factors should be considered as well. Even with the IWs ranked, a cut-off between KIWs and IWs needed to be determined. This step took a dual approach; a weighted score was determined for each IW based on a variety of factors, and a basic ranking of IWs was determined based on the number of links with other IWs. The basic rankings could then be used to control the more nuanced ranking from the weighted scores with. The reasoning behind the validity of the number of links as a basic indicator, and the weighting behind various factors, are discussed alongside the documented process that follows.

5.3.3.1) The Basic Ranking – Number of Links with other Influential Works (IWs)

The need for multidomain research (see Chapter 1.3.3.1) presents certain challenges. Domains which fall into the area of interest also contain material that is not relevant. The same applies to authors whose work falls under the area of interest. This is illustrated in Figure 5-4:

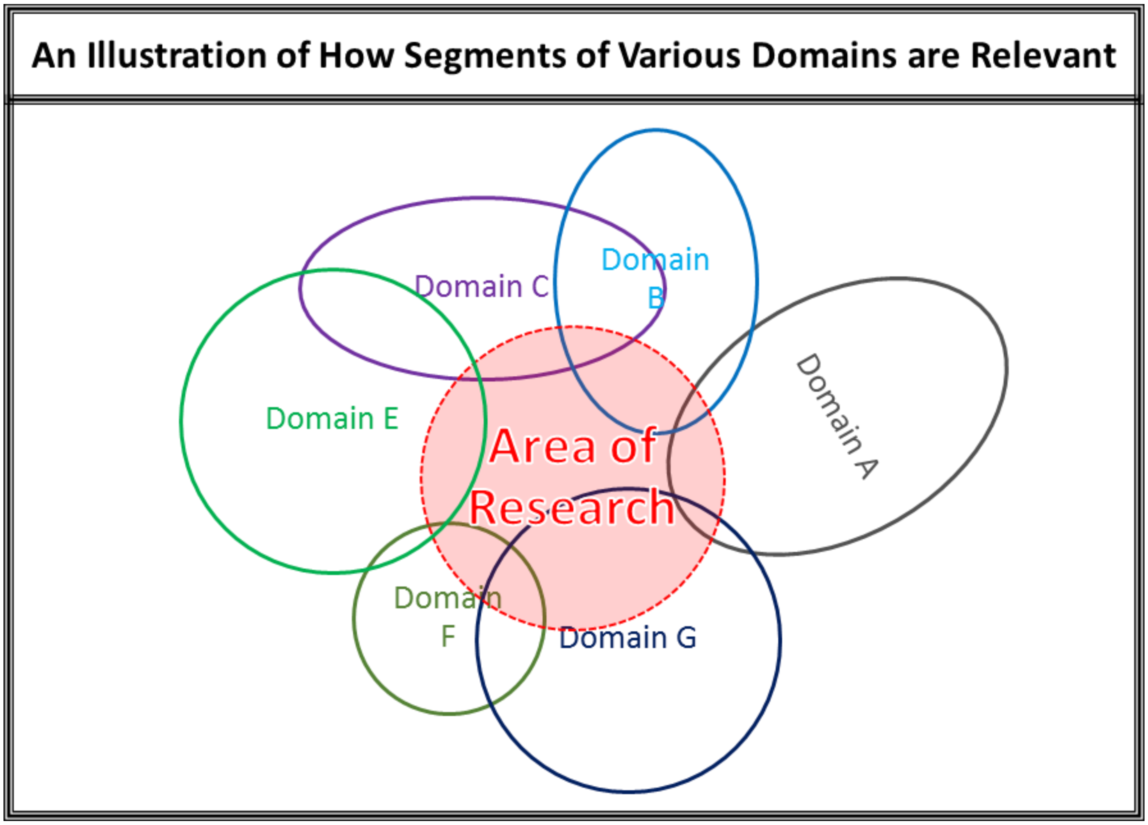


Figure 5-4: An Illustration of how parts of various domains fall under the current area of research

During the identification process, discretion was used to select works that fit in the current area of research, yet many of the papers might use similar terminology and address related issues, but not in the context of this area of research. It followed that considering the links between IWs should help to identify which papers were influential in the desired domain or area of research. Number of citations or average impact factors are not sufficient to identify the KIWs, as they do not make this distinction.

The IWs were therefore chronologically arranged and linked together via citations. 136 links were identified between the 59 IWs as illustrated in Figure 5-5[4]:

[4] The careful reader might notice that there are three papers in Figure 5-5 in the same year (1979) that reference each other. This oddity can be understood by noting the nature of the papers:

- The most prominent of the three, Holmström's 'Moral Hazard and Observability', is based on Chapter 4 of the author's unpublished dissertation submitted in 1977. More specifically it was presented at the European Meeting of the Econometric Society in Geneva in 1978.
- Shavell's 'Risk sharing and Incentives in the Principal agent relationship' is published in the same issue of the Bell Journal of Economics as Holmström's paper. They cite older related works of each other regularly. It seems likely that there might have been some degree of collaboration.
- Harris and Raviv's 'Optimal Incentive Contracts with Imperfect Information' was written in 1976 and revised in 1978. The authors specifically thank Shavell for useful suggestions.

An Illustration: Links between Chronologically Arranged Influential Works

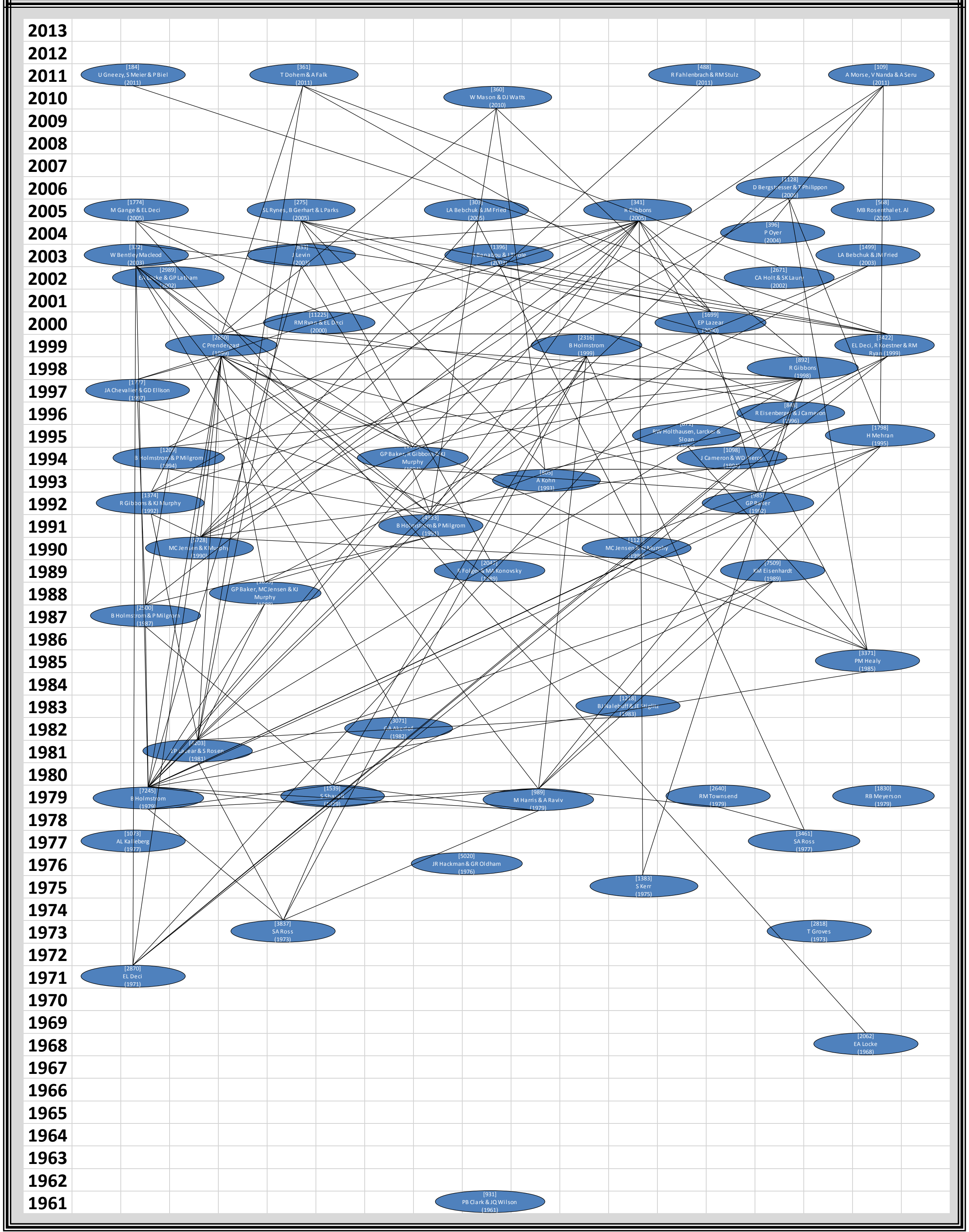


Figure 5-5: An illustration of the links between the chronologically arranged Influential Works

The exact number of links for each paper, as illustrated in Figure 5-5, can be found on Table 5-5. Table 5-5 also assigns an identification number (Paper ID) to each paper, which will be used in the rest of this section. Table 5-5 arranges the IWs according to the total number of links with other Influential Works (IWs).

Table 5-5: Data for illustration in Figure 5-5 - IWs arranged according to links with other IWs, and assigned Paper IDs

Paper ID*	Year	Author	Links**	Cited by IW***	Citing IW****	Google Scholar Citations	Web of Science Citations
1	1979	B Holmström	19	16	3	7245	1860
2	1999	C Prendergast	17	5	12	2850	694
3	2005	R Gibbons	13	0	13	341	81
4	1979	M Harris & A Raviv	11	8	3	989	315
5	1998	R Gibbons	10	2	8	892	179
6	1991	B Holmström & P Milgrom	10	8	2	4933	1167
7	1990	MC Jensen & KJ Murphy	9	9	0	5728	1247
8	2003	W Bentley Macleod	8	1	7	322	72
9	1999	EL Deci, R Koestner & RM Ryan	8	5	3	3422	988
10	1994	GP Baker, R Gibbons & KJ Murphy	8	5	3	1179	297
11	1981	EP Lazear & S Rosen	8	7	1	4203	1134
12	1979	S Shavell	8	5	3	1539	484
13	1992	GP Baker	7	4	3	985	249
14	2005	SL Rynes, B Gerhart & L Parks	6	0	6	275	98
15	2000	EP Lazear	6	4	2	1699	353
16	1999	B Holmström	6	0	6	2316	367
17	1996	R Eisenberger & J Cameron	6	3	3	848	270
18	1995	H Mehran	6	2	4	1789	318
19	1987	B Holmström & P Milgrom	6	4	2	2500	655
20	1985	PM Healy	6	5	1	3371	599
21	1971	EL Deci	6	6	0	2870	911
22	2003	J Levin	5	2	3	833	173
23	1997	JA Chevalier & GD Ellison	5	3	2	1777	363
24	1992	R Gibbons & KJ Murphy	5	3	2	1374	336
25	1988	GP Baker, MC Jensen & KJ Murphy	5	3	2	1839	459
26	1973	SA Ross	5	5	0	3837	648
27	2011	A Morse, V Nanda & A Seru	4	0	4	109	7
28	2011	T Dohem & A Falk	4	0	4	361	35
29	2010	W Mason & DJ Watts	4	0	4	360	-
30	2005	M Gange & EL Deci	4	0	4	1774	485
31	1994	J Cameron & WD Pierce	4	2	2	1098	274
32	1994	B Holmström & P Milgrom	4	2	2	1209	420
33	1993	A Kohn	4	4	0	805	104
34	1990	MC Jensen & KJ Murphy	4	2	2	1123	116
35	2006	D Bergstresser & T Philippon	3	0	3	1128	195
36	2000	RM Ryan & EL Deci	3	1	2	11225	3530
37	1989	KM Eisenhardt	3	0	3	7509	1629
38	2005	LA Bebchuk & JM Fried	2	0	2	303	-
39	2003	LA Bebchuk & JM Fried	2	0	2	1499	270
40	2003	R Benabou & J Tirole	2	0	2	1396	306

Paper ID*	Year	Author	Links**	Cited by IW***	Citing IW****	Google Scholar Citations	Web of Science Citations
41	1983	BJ Nalebuff & JE Stiglitz	2	1	1	1218	358
42	1979	RM Townsend	2	0	2	2640	644
43	1977	SA Ross	2	2	0	3461	616
44	1975	S Kerr	2	2	0	1383	417
45	2011	R Fahlenbrach & RM Stulz	1	0	1	488	70
46	2011	U Gneezy, S Meier & P Rey-Biel	1	0	1	184	33
47	2004	P Oyer	1	1	0	396	95
48	2002	CA Holt & SK Laury	1	1	0	2671	719
49	1995	RW Holthausen, DF Larcker & RG Sloan	1	0	1	871	144
50	1989	R Folger & MA Konovsky	1	1	0	2047	740
51	1982	GA Akerlof	1	1	0	3071	718
52	1968	EA Locke	1	1	0	2062	706
53	2005	MB Rosenthal et. Al	0	0	0	568	353
54	2002	EA Locke & GP Latham	0	0	0	2989	995
55	1979	RB Myerson	0	0	0	1830	614
56	1977	AL Kalleberg	0	0	0	1073	332
57	1976	JR Hackman & GR Oldham	0	0	0	5020	1597
58	1973	T Groves	0	0	0	2818	928
59	1961	PB Clark & JQ Wilson	0	0	0	931	295

*The title for the papers can be found on Table 5-3 and Table 5-4 which are arranged chronologically.

**Links indicates the number of times a paper is cited by and cites other influential papers.

***The number of times this paper is cited by other influential papers.

****The number of times this papers cites other influential papers.

Table 5-5 thus provides a basic ranking of the Influential Works (IWs) according to links with other IWs. It is noted that this does not provide a cut-off between what IWs are to be considered as KIWs. This is discussed in the subsection below (Chapter 5.3.3.3). The basic ranking is not provided as final, rather it is to be used to control the findings from the more nuanced ranking from Chapter 5.3.3.2 as discussed in Chapter 5.3.3.4.

5.3.3.2) The Weighted Table – Ranking According to a Variety of Factors

Instead of considering merely how many citations a papers has, or how well it is linked to other IWs, a more holistic ranking system was devised. The following factors were taken into consideration; how influential papers are in the current domain, how well papers are connected to the current domain, and how influential papers are in general. The data required are citation details between IWs and how many citations the IWs have in general. The measures that are used in the weighted table are thus:

- Links with other IWs:
  - Total number of links.
  - Number of times cited by IWs.
  - Number of times citing IWs.
- Number of citations:
  - Google Scholar.

- Web of Science.
- Date published.

The weighted table (Table 5-9) assigns a score out of a total of 100. The following steps were used to calculate and assign weights for each of the factors taken into consideration:

- 'Links with other IWs' (60) vs. 'Number of Citations' (40): The division in the weighting is 60/40, between links with other IWs and number of citations. This division was selected since a paper that is well linked to and cited by IWs is more relevant than a paper with more citations but not linked to IWs.
- The 60 points assigned to 'Links with other IWs' is distributed as follows:
  - 'Cited by IWs' (40) vs. 'Citing IWs' (20): The 60 points assigned to links with other IWs is divided 40/20 between cited by IWs and citing IWs. This division was selected as a paper highly regarded by IWs is more relevant than a paper that simply links itself to IWs.
- The 40 points assigned to 'Number of Citations' is distributed between the numbers from the two databases, and subject to a modification factor:
  - 'Google Scholar Citations' (20) vs. 'Web of Science Citations' (20): The 40 points assigned to number of citations is divided 20/20 between Google Scholar and Web of Science. This was done to balance the number of citations from different sources.
  - Date published modification factor: The 40 points assigned to number of citations is subject to a modification factor. This modification factor accounts for recent papers not having had a chance to accumulate citations. The citation scores for papers from 2003–2013 was adjusted according to Thomson Reuters' Essential Science Indicators (Times Higher Education, 2011) as shown below on Table 5-8.

Each measure on the weighted table needs a scale that can be used to determine the score for each paper. As the measures are based on numerical data equal-to or greater-than zero a simple linear scale will be used with zero assigned to data points of zero and the highest rating assigned to the largest data point. Outliers have to be disregarded to ensure the scale is able to assign significantly different scores to different papers. The outliers will receive the maximum score. As the data is not symmetrical, standard deviation is not helpful, instead the basic interquartile range (IQR) method will be used. Table 5-6 shows the outliers for each data set as well as the method used to determine them:

Table 5-6: Identification of outliers and using the IQR method

	25^{th} Percen-tile	**75^{th} Percen-tile**	**IQR**	**1.5 X IQR**	**Upper Limit**	**Lower Limit**	**Outliers**	**Outlier Paper ID**
Calculations			25^{th}-75^{th}		75^{th} + 1.5*IQR	25^{th} – 1.5*IQR		
Cited by IW	0	4	4	6	10	-6	16	1
Citing IW	0	3	3	4.5	7.5	-4.5	13, 12, 8	2, 3, 5
Google Scholar	871	2850	1979	2969	5818	-2098	11225, 7509, 7245	1, 36, 37
Web of Science	222	712	490	735	1447	-513	3530, 1860, 1629, 1597	1, 36, 37, 57

The upper limit for each measure can now be used in conjunction with the number of points that is awarded to each measure to determine the number of points per citation or link. The calculations are shown in Table 5-7:

Table 5-7: Number of weighting points per citation or link for the various measures

	Available Points	Highest Data Point	Points
Cited by IW	40	9	4.44 per link
Citing IW	20	7	2.86 per link
Google Scholar	20	5728	3.49 per 1000 citations
Web of Science	20	1247	1.68 per 100 citations

The only additional calculation that is required to complete the weighted table is the modification factors for the papers published from 2003–2013. As noted, the essential science indicators from Thompson and Reuters was used. The average number of citations across all fields for the period was used. An amplification factor was determined for 2004–2013 so that the averages were equal to 2003. This is shown on Table 5-8:

Table 5-8: Yearly citations averages and the required modification factor for 2004-2013

	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
Ave Citations*	19.92	18.91	17.76	16.08	14.56	12.35	9.82	7.64	4.87	2.39	0.41
X Factor	1	1.05	1.12	1.24	1.37	1.61	2.03	2.61	4.09	8.33	48.59**

*Citation averages for 2000–2010 (Times Higher Education, 2011) adapted to 2003–2013.

**The volatile modification factor from 2013 is not a problem as the most recent IW is from 2011.

The data is combined on Table 5-9 to determine a weighted score for each IW:

Table 5-9: Data pertaining to the relevance of Influential Works (IWs) - a weighted table

ID*	Date	Google Scholar Citations	Web of Science Citations	Links	Cited by IWs	Citing IWs	Links with other IWs			Number of Citations					Weighted Average (100)
		(Number)					Cited by IWs (40)	Citing IWs (20)	Total (60)	Google Scholar (20)	Web of Science (20)	GS+ WoS (40)	Mod Factor (≥1)	Total (40)	
1	1979	7245	1860	19	16	3	40	8.6	48.6	20	20	40	1	40	88.6
2	1999	2850	694	17	5	12	22.2	20	42.2	10	11.1	21.1	1	21.1	63.3
3	2005	341	81	13	0	13	0	20	20	1.2	1.3	2.5	1.12	2.8	22.8
4	1979	989	315	11	8	3	35.6	8.6	44.1	3.5	5.1	8.5	1	8.5	52.6
5	1998	892	179	10	2	8	8.9	20	28.9	3.1	2.9	6	1	6	34.9
6	1991	4933	1167	10	8	2	35.6	5.7	41.3	17.2	18.7	35.9	1	35.9	77.2
7	1990	5728	1247	9	9	0	40	0	40	20	20	40	1	40	80
8	2003	322	72	8	1	7	4.4	20	24.4	1.1	1.2	2.3	1	2.3	26.7
9	1999	3422	988	8	5	3	22.2	8.6	30.8	11.9	15.8	27.8	1	27.8	58.6
10	1994	1179	297	8	5	3	22.2	8.6	30.8	4.1	4.8	8.9	1	8.9	39.7
11	1981	4203	1134	8	7	1	31.1	2.9	34	14.7	18.2	32.9	1	32.9	66.8
12	1979	1539	484	8	5	3	22.2	8.6	30.8	5.4	7.8	13.1	1	13.1	43.9
13	1992	985	249	7	4	3	17.8	8.6	26.3	3.4	4	7.4	1	7.4	33.8
14	2005	275	98	6	0	6	0	17.1	17.1	1	1.6	2.5	1.12	2.8	20
15	2000	1699	353	6	4	2	17.8	5.7	23.5	5.9	5.7	11.6	1	11.6	35.1
16	1999	2316	367	6	0	6	0	17.1	17.1	8.1	5.9	14	1	14	31.1
17	1996	848	270	6	3	3	13.3	8.6	21.9	3	4.3	7.3	1	7.3	29.2
18	1995	1789	318	6	2	4	8.9	11.4	20.3	6.2	5.1	11.3	1	11.3	31.7
19	1987	2500	655	6	4	2	17.8	5.7	23.5	8.7	10.5	19.2	1	19.2	42.7
20	1985	3371	599	6	5	1	22.2	2.9	25.1	11.8	9.6	21.4	1	21.4	46.5
21	1971	2870	911	6	6	0	26.7	0	26.7	10	14.6	24.6	1	24.6	51.3
22	2003	833	173	5	2	3	8.9	8.6	17.5	2.9	2.8	5.7	1	5.7	23.1
23	1997	1777	363	5	3	2	13.3	5.7	19	6.2	5.8	12	1	12	31.1
24	1992	1374	336	5	3	2	13.3	5.7	19	4.8	5.4	10.2	1	10.2	29.2
25	1988	1839	459	5	3	2	13.3	5.7	19	6.4	7.4	13.8	1	13.8	32.8
26	1973	3837	648	5	5	0	22.2	0	22.2	13.4	10.4	23.8	1	23.8	46
27	2011	109	7	4	0	4	0	11.4	11.4	0.4	0.1	0.5	4.09	2	13.4
28	2011	361	35	4	0	4	0	11.4	11.4	1.3	0.6	1.8	4.09	7.5	18.9
29	2010	360	-	4	0	4	0	11.4	11.4	1.3	1.3	2.5	2.61	6.6	18
30	2005	1774	485	4	0	4	0	11.4	11.4	6.2	7.8	14	1.12	15.6	27.1

ID*	Date	Google Scholar Citations	Web of Science Citations	Links	Cited by IWs	Citing IWs	Links with other IWs: Cited by IWs (40)	Links with other IWs: Citing IWs (20)	Links with other IWs: Total (60)	Number of Citations: Google Scholar (20)	Number of Citations: Web of Science (20)	Number of Citations: GS+ WoS (40)	Number of Citations: Mod Factor (≥1)	Number of Citations: Total (40)	Weighted Average (100)
		(Number)													
31	1994	1098	274	4	2	2	8.9	5.7	14.6	3.8	4.4	8.2	1	8.2	22.8
32	1994	1209	420	4	2	2	8.9	5.7	14.6	4.2	6.7	11	1	11	25.6
33	1993	805	104	4	4	0	17.8	0	17.8	2.8	1.7	4.5	1	4.5	22.3
34	1990	1123	116	4	2	2	8.9	5.7	14.6	3.9	1.9	5.8	1	5.8	20.4
35	2006	1128	195	3	0	3	0	8.6	8.6	3.9	3.1	7.1	1.24	8.8	17.3
36	2000	11225	3530	3	1	2	4.4	5.7	10.2	20	20	40	1	40	50.2
37	1989	7509	1629	3	0	3	0	8.6	8.6	20	20	40	1	40	48.6
38	2005	303	-	2	0	2	0	5.7	5.7	1.1	1.1	2.1	1.12	2.4	8.1
39	2003	1499	270	2	0	2	0	5.7	5.7	5.2	4.3	9.6	1	9.6	15.3
40	2003	1396	306	2	0	2	0	5.7	5.7	4.9	4.9	9.8	1	9.8	15.5
41	1983	1218	358	2	1	1	4.4	2.9	7.3	4.3	5.7	10	1	10	17.3
42	1979	2640	644	2	0	2	0	5.7	5.7	9.2	10.3	19.5	1	19.5	25.3
43	1977	3461	616	2	2	0	8.9	0	8.9	12.1	9.9	22	1	22	30.9
44	1975	1383	417	2	2	0	8.9	0	8.9	4.8	6.7	11.5	1	11.5	20.4
45	2011	488	70	1	0	1	0	2.9	2.9	1.7	1.1	2.8	4.09	11.6	14.4
46	2011	184	33	1	0	1	0	2.9	2.9	0.6	0.5	1.2	4.09	4.8	7.6
47	2004	396	95	1	1	0	4.4	0	4.4	1.4	1.5	2.9	1.05	3.1	7.5
48	2002	2671	719	1	1	0	4.4	0	4.4	9.3	11.5	20.9	1	20.9	25.3
49	1995	871	144	1	0	1	0	2.9	2.9	3	2.3	5.4	1	5.4	8.2
50	1989	2047	740	1	1	0	4.4	0	4.4	7.1	11.9	19	1	19	23.5
51	1982	3071	718	1	1	0	4.4	0	4.4	10.7	11.5	22.2	1	22.2	26.7
52	1968	2062	706	1	1	0	4.4	0	4.4	7.2	11.3	18.5	1	18.5	23
53	2005	568	353	0	0	0	0	0	0	2	5.7	7.6	1.12	8.6	8.6
54	2002	2989	995	0	0	0	0	0	0	10.4	16	26.4	1	26.4	26.4
55	1979	1830	614	0	0	0	0	0	0	6.4	9.8	16.2	1	16.2	16.2
56	1977	1073	332	0	0	0	0	0	0	3.7	5.3	9.1	1	9.1	9.1
57	1976	5020	1597	0	0	0	0	0	0	17.5	20	37.5	1	37.5	37.5
58	1973	2818	928	0	0	0	0	0	0	9.8	14.9	24.7	1	24.7	24.7
59	1961	931	295	0	0	0	0	0	0	3.3	4.7	8	1	8	8

*The author and title details for KIWs are brought together on Table 5-10. Refer to Table 5-5 for details concerning other papers.

The Influential Works (IWs) can now be arranged according to their weighted score on the right-hand side of Table 5-9. The results are shown in Figure 5-6:

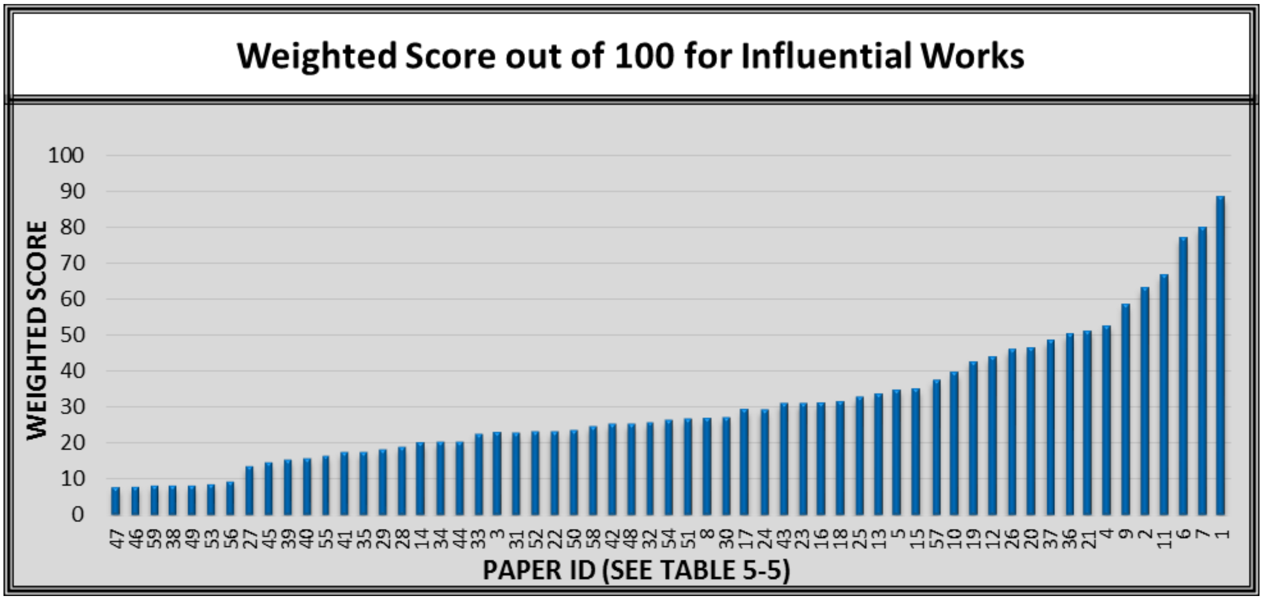


Figure 5-6: The Influential Works arranged according to their score on the weighted table

As with the basic ranking of the IWs according to links with other IWs, the rankings according to the weighted table still do not provide a cut-off between which IWs are to be considered as KIWs.

5.3.3.3) Determining the Cut-Off between IWs and KIWs

Neither the nuanced rankings, as shown in Figure 5-6, nor the basic ranking, according to links with other IWs shown in Figure 5-7, reveals a clear cut-off point between IWs and KIWs.

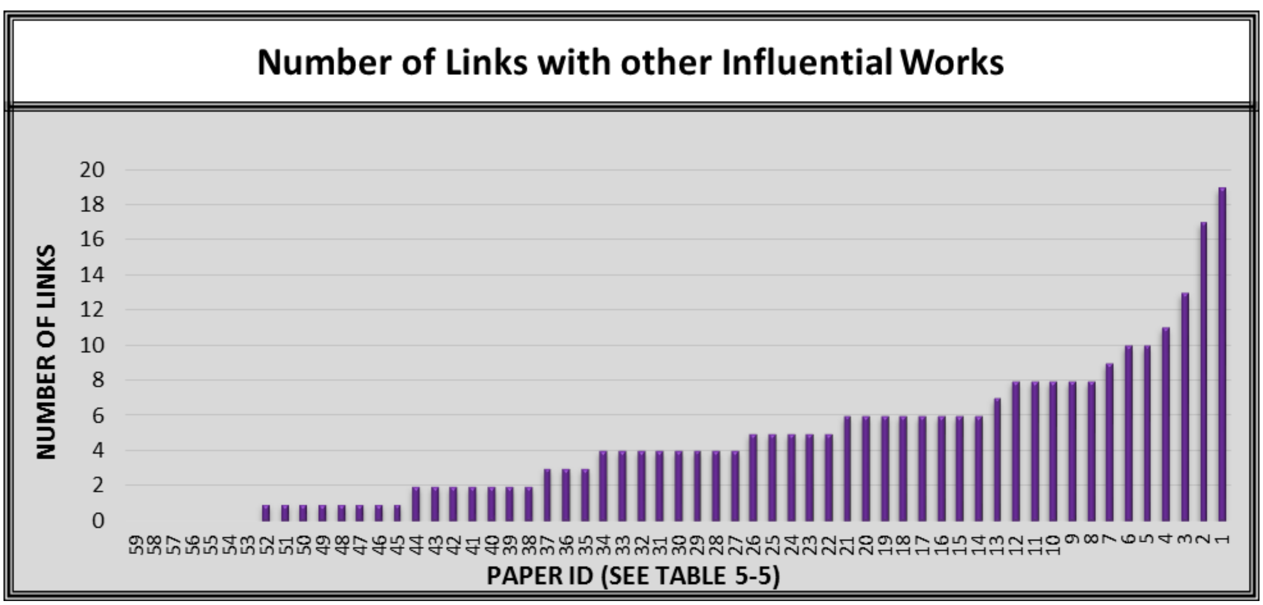


Figure 5-7: The Influential Works (IWs) arranged according to the number of links with other IWs

It is also apparent that the rankings are not the same; this will be discussed in Chapter 5.3.3.4. This subsection discusses how many of the 59 IWs should be considered to be KIWs.

The outcome was that 20 IWs would be regarded as KIWs. It must be acknowledged that, while the decision was based on what the data seemed to suggest, no clear-cut objective formula could determine whether 19, 20, or 21 papers should be deemed to be KIWs. This is not a problem as the findings can be used to verify whether 20 papers is an adequate number. The results (refer to Table 5-12), are very convincing. The data from the top ten papers (ID: 1, 7, 6, 11, 2, 9, 4, 21, 36, and 37) are not extended by the data from the second ten papers (ID: 20, 26, 12, 19, 10, 57, 15, 5, 13, and 25). When each consideration in Table 5-12 is individually considered, the second ten papers do a very good job of mirroring the first ten, except for Relatedness/Purpose (KC12) and Social Loafing or Free Riding (KC15). Relatedness/Purpose (KC12) is well represented in the first ten papers, but not in the second ten and is included in the final model while Social Loafing or Free Riding (KC15) is only mentioned in one paper and does not end up being deemed a PIC.

5.3.3.4) Controlling with the Basic Ranking

While the rankings from the more holistic weighted table are used to select the KIWs, the basic rankings according to links between IWs serves as a useful control mechanism. The IWs, arranged according to their score on the weighted table, is shown in Figure 5-8; the dotted line marks the cut-off point between KIWs and IWs, and the red bars indicate works that would have made the cut-off if only the basic approach was considered.

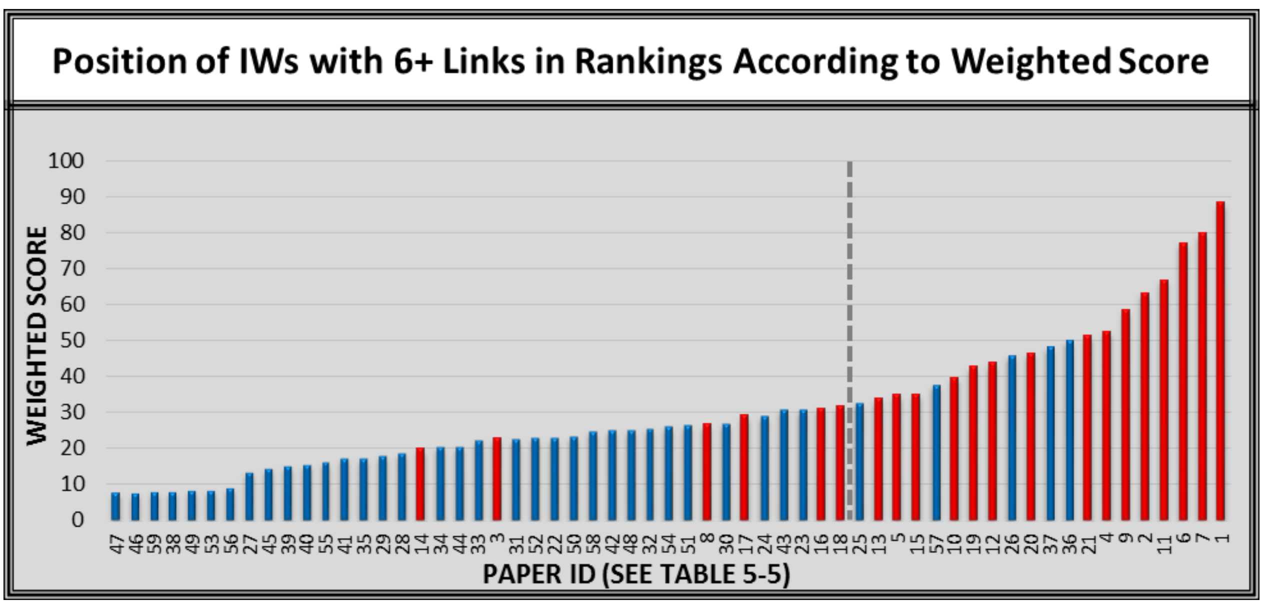


Figure 5-8: Influential Works (IWs) arranged according to weighted scores with cut-off and IWs according to the basic approach shown in red

The filter seems to have worked well. Take the papers with IDs 3 and 14 for example (they are the two red bars on the left); these works have a small number of citations and are not cited by Influential Works, but made the initial list solely though citing numerous Influential Works. While they refer to relevant works they are clearly not influential themselves. Papers 36 and 37, the two blue bars on the right, only have a moderate number of links, but are extremely well cited. It is noted that paper 57 is an anomaly as it is not linked to other IWs. When Table 5-12 is retrospectively scrutinised it is clear that paper 57 does not introduce concepts that are foreign to the other KIWs. It does emphasise Job Design, which is also emphasised in paper 6 (ranked third) and mentioned in papers 2 and 36 (ranked fifth and ninth).

5.3.3.5) Final List of Key Influential Works

The papers hence regarded as KIWs are shown on Table 5-10:

Table 5-10: List of papers regarded as key Influential Works

ID	Year	Score on weighted table	Author	Title
1	1979	88.6	B Holmström	Moral hazard and observability
7	1990	80.0	MC Jensen & K Murphy	Performance pay and top-management incentives
6	1991	77.2	B Holmström & P Milgrom	Multitask Principal-Agent Analyses: Incentive Contracts, Asset Ownership, and Job Design
11	1981	66.8	EP Lazear & S Rosen	Rank-order tournaments as optimum labor contracts
2	1999	63.3	C Prendergast	The provision of incentives in firms
9	1999	58.6	EL Deci, R Koestner & RM Ryan	A meta-analytic review of experiments examining the effects of extrinsic rewards on intrinsic motivation
4	1979	52.6	M Harris & A Raviv	Optimal Incentive Contracts with Imperfect Information
21	1971	51.3	EL Deci	Effects of externally mediated rewards on intrinsic motivation
36	2000	50.2	RM Ryan & EL Deci	Self-determination theory and the facilitation of intrinsic motivation, social development, and well-being
37	1989	48.6	KM Eisenhardt	Agency theory: An assessment and review
20	1985	46.5	PM Healy	The effect of bonus schemes on accounting decisions
26	1973	46.0	SA Ross	The economic theory of agency: The principal's problem
12	1979	43.9	S Shavell	Risk sharing and Incentives in the Principal agent relationship
19	1987	42.7	B Holmström & P Milgrom	Aggregation and linearity in the provision of intertemporal incentives
10	1994	39.7	GP Baker, R Gibbons & KJ Murphy	Subjective performance measures in optimal incentive contracts
57	1976	37.5	JR Hackman & GR Oldham	Motivation through the Design of Work: Test of a Theory
15	2000	35.1	EP Lazear	Performance pay and productivity
5	1998	34.9	R Gibbons	Incentives in Organizations
13	1992	33.8	GP Baker	Incentive contracts and performance measurement
25	1988	32.8	GP Baker, MC Jensen & KJ Murphy	Compensation and incentives: Practice vs. theory

This list includes eight out of the eleven papers that were identified as KIWs during the research proposal. Stiglitz's 1975 paper and Dixit's 2002 paper did not make the short list for Influential Works. Holmström's 1999 paper "Managerial incentive problems: A dynamic perspective" was ranked 22 and just missed the cut-off point. It was not cited by any other Influential Works.

5.4) Extracting the PICs from the Key Influential Works (KIWs)

This subsection provides an overview of the process required to extract the PICs from the Key Influential Works. The findings are processed and compared with the findings of an initial ad hoc investigation.

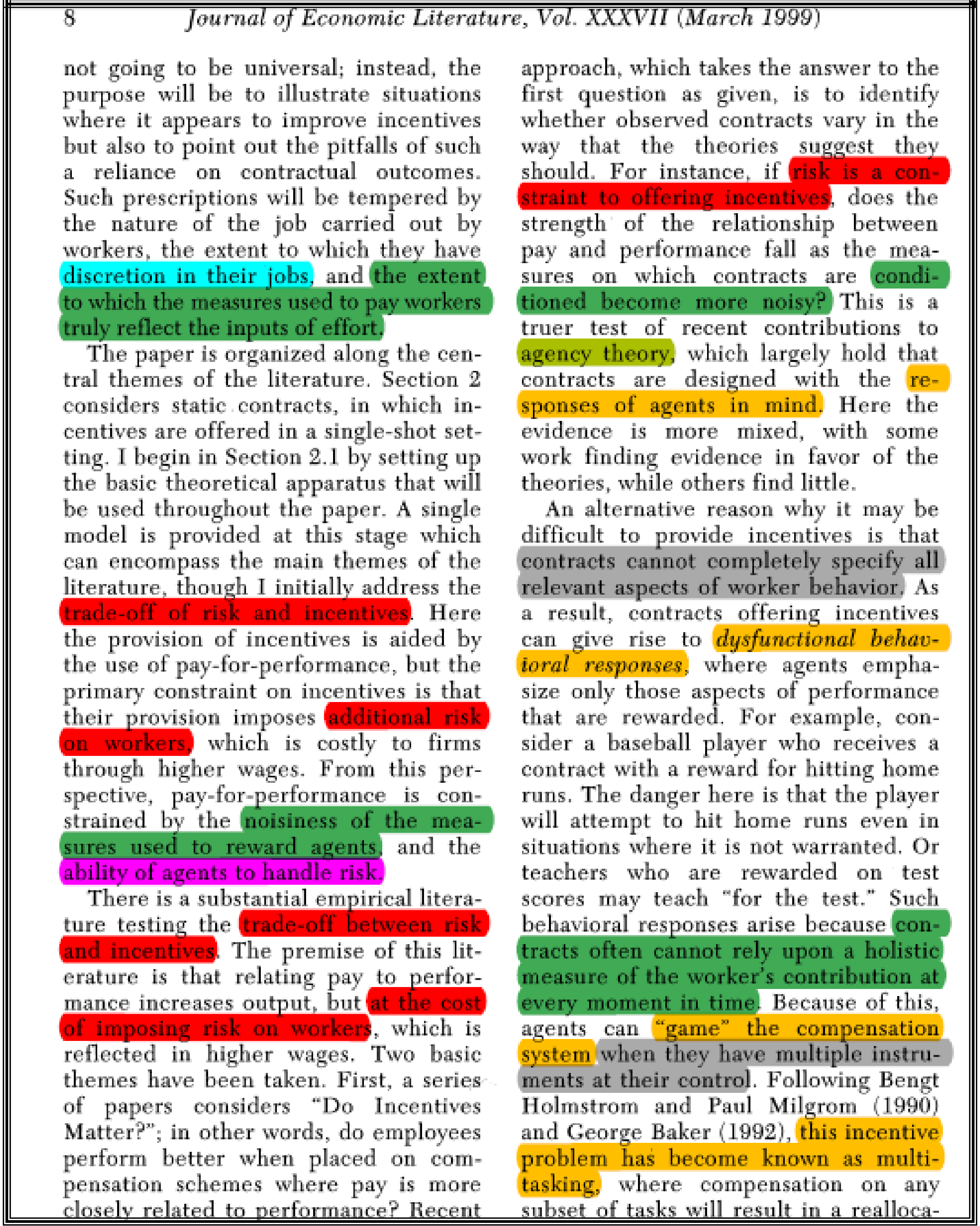
The PICs can now be extracted from the 20 Key Influential Works (KIWs) on Table 5-10. This was done by identifying the considerations discussed in each KIW and isolating the primary considerations.

5.4.1) Identification of Considerations Discussed in Key Influential Works (Figure 5-1 – C1)

This subsection illustrates how considerations were identified in the KIWs.

The considerations discussed in each Key Influential Work (KIW) was identified by manually scrutinising each paper's introduction, conclusion, and discussion, if necessary. This process is illustrated in Figure 5-9:

Illustration of Manual Identification Process of Considerations from KIWs



8 *Journal of Economic Literature, Vol. XXXVII (March 1999)*

not going to be universal; instead, the purpose will be to illustrate situations where it appears to improve incentives but also to point out the pitfalls of such a reliance on contractual outcomes. Such prescriptions will be tempered by the nature of the job carried out by workers, the extent to which they have discretion in their jobs, and the extent to which the measures used to pay workers truly reflect the inputs of effort.

The paper is organized along the central themes of the literature. Section 2 considers static contracts, in which incentives are offered in a single-shot setting. I begin in Section 2.1 by setting up the basic theoretical apparatus that will be used throughout the paper. A single model is provided at this stage which can encompass the main themes of the literature, though I initially address the trade-off of risk and incentives. Here the provision of incentives is aided by the use of pay-for-performance, but the primary constraint on incentives is that their provision imposes additional risk on workers, which is costly to firms through higher wages. From this perspective, pay-for-performance is constrained by the noisiness of the measures used to reward agents, and the ability of agents to handle risk.

There is a substantial empirical literature testing the trade-off between risk and incentives. The premise of this literature is that relating pay to performance increases output, but at the cost of imposing risk on workers, which is reflected in higher wages. Two basic themes have been taken. First, a series of papers considers "Do Incentives Matter?"; in other words, do employees perform better when placed on compensation schemes where pay is more closely related to performance? Recent approach, which takes the answer to the first question as given, is to identify whether observed contracts vary in the way that the theories suggest they should. For instance, if risk is a constraint to offering incentives, does the strength of the relationship between pay and performance fall as the measures on which contracts are conditioned become more noisy? This is a truer test of recent contributions to agency theory, which largely hold that contracts are designed with the responses of agents in mind. Here the evidence is more mixed, with some work finding evidence in favor of the theories, while others find little.

An alternative reason why it may be difficult to provide incentives is that contracts cannot completely specify all relevant aspects of worker behavior. As a result, contracts offering incentives can give rise to *dysfunctional behavioral responses*, where agents emphasize only those aspects of performance that are rewarded. For example, consider a baseball player who receives a contract with a reward for hitting home runs. The danger here is that the player will attempt to hit home runs even in situations where it is not warranted. Or teachers who are rewarded on test scores may teach "for the test." Such behavioral responses arise because contracts often cannot rely upon a holistic measure of the worker's contribution at every moment in time. Because of this, agents can "game" the compensation system when they have multiple instruments at their control. Following Bengt Holmstrom and Paul Milgrom (1990) and George Baker (1992), this incentive problem has become known as multitasking, where compensation on any subset of tasks will result in a realloca-

Figure 5-9: An illustration of the manual identification process used to extract the considerations discussed in the KIWs

The terms, phrases, and concepts were then sorted into categories. While the categorisation was done manually, terms typically associated with the various considerations are summarised on Table 5-11:

Table 5-11: Terms associated with respective incentive plan design considerations as per the Key Influential Works

*	Considerations	Terms, Phrases, and Concepts
KC1	Autonomy	Discretion in their jobs, Outside activities, Control, Allocation of authority, Choice, Decentralised decision-making.
KC2	Career Concerns	Promotion, Efficiency Wages, Prospect of future returns, Career concerns, Workers employed for long time, Ascends a firm's hierarchy, Renegotiation opportunities, Career, Future contracts, Hierarchy incentives, Deferred Compensation, Advancement.
KC3	Perceived Competence	Learning, Verbal reinforcement, Achievement and recognition, Positive feedback, Feelings of self-esteem, Personal growth.
KC4	Employee Risk Characteristics	Risk neutral, Attitudes to risk, Willingness to take risks, Risk aversion, Agent may be too cautious, Risk tolerances, Agent's ability to handle risk.
KC5	Gaming or Multitasking	Dysfunctional behaviour, Optimising relative to contract, Private gain, Game the system, Risky strategies, Manipulation, Multitasking, Cheating, Suboptimal actions, Shirking, Sabotage, Adverse side effects, Responses of agents, Abuse, Currying favour, Misallocation of effort.
KC6	Intrinsic Motivation	Self-motivation, Inherent Motivation, Locus of control.
KC7	Job Complexity	Multidimensional Tasks, Major reallocation opportunities, Higher order thinking skills, Aspects of worker behaviour, Difficult job specifications, Repetitiveness of jobs, Multiple instruments, Hard to predict consequences.
KC8	Job design	Task separation, Task allocation. Redesign of work, Job enrichment, Grouping of task.
KC9	Moral Hazard	Conflict of interest, Agency theory, Interest not aligned, Principal agent problem.
KC10	Perceived Fairness	Trust, Firm reneging, Horizontal equity concerns, Wage differentiation, Value of being trustworthy, Subjective measures unpopular, Disapproval of high rewards, Egalitarian pay systems.
KC11	Performance Measurability	Actions cannot be observed, Performance measures, Asymmetric information, Observation of actions, Noisiness of measures, Performance estimates, Observation, Evaluations, Visibility of behaviours, Information, Subjective assessments, Uncertainty, Imperfect information, Evaluation procedures, Measurement error, Imperfect monitoring, Acquiring information, Surveillance.
KC12	Relatedness/Purpose	Employment vs. contracting, Alienation, Connectedness, Interpersonal contexts, Detachment and disengagement.
KC13	Risk to Employee	Risk sharing, Imposing risk on workers, Principal's risk profile, Unwanted risk, Risk constraints, Guarantees, Risk and incentives, Risk allocation.
KC14	Selection Effects	Human capital, Adverse selection, Skill acquisition, Sort workers, Self-selection, Attracting a better workforce.
KC15	Social Loafing or Free Riding	1/n problem, Diminished returns.
KC16	Team Production	Joint contributions, Peer pressure, Treating employees differently, Shared benefits, Cooperation among workers.

*KC denotes the Considerations as per the Key Influential Works.

5.4.2) Isolation of Primary Considerations (Figure 5-1 – C2)

This subsection notes how often various considerations are found in different Key Influential Works.

The frequency and prominence of each of the considerations from the Key Influential Works (KC1→KC16) were used to gauge whether they are essential and whether they should be regarded as PICs. Table 5-12 shows how many times each consideration is discussed in the portion of each Key Influential Work (KIW) that was taken into account. The portion of the KIW that was taken into account depends on the structure of the specific paper. If the introduction gave a good overview of the paper, only the introduction was considered. In some cases, however, it was necessary to include the conclusion or discussion sections to get a balanced overview of the topics discussed in the paper.

Table 5-12: Number of counters for different considerations in Key Influential Works

	Paper ID**																				Occurrences	
	1	7	6	11	2	9	4	21	36	37	20	26	12	19	10	57	15	5	13	25	Total	Papers
KC1*			5		1	2	2		4							4				2	20	7
KC2				1	12											1				4	18	4
KC3					1	2		2	5							3				1	14	6
KC4		1	4	4	1		4			5			6	4			1	2	3	1	36	12
KC5	2	1	9	2	11		1				5			2	7	1	1	7	4	7	60	14
KC6					1	9		11	3							2				2	28	6
KC7		1	6		5											5		1			18	5
KC8			9		1				2							11					23	4
KC9	4	2	4	1	2		4			11	1	3	1	3				2	1	2	41	14
KC10		2	1												4					7	14	4
KC11	15	4	19	10	12	1	16			6	3	7	11	7	12	2	5	10	7	5	152	18
KC12			1			2		3	3												9	4
KC13	4		5	4	5		3			5		1	9	2			2	4		2	46	12
KC14				3	1					1						3	7	1		1	17	7
KC15					2																2	1
KC16			2		4					1							1	1		1	10	6

*The considerations, as well as the terms/phrases used to identify them from the KIWs, can be found on Table 5-11.
**The papers associated with the paper IDs can be found in Table 5-10.

While the number of papers each consideration is found in and the overall number of occurrences for each consideration is a good indication of its importance, it is not a perfect measure. As the portion of each paper that had to be examined for a balanced perspective varied, the number of consideration occurrences varied from nine to 65 per paper. It follows that five occurrences like that of KC5 in paper ID20 is more significant than the five occurrences of KC1 in paper ID6. While the findings on Table 5-12 can be analysed in various ways, it must be kept in mind that the 20 papers examined here are the KIWs, the most influential works related to this domain. It might be argued that a consideration discussed by any of these papers should be considered worthy of being regarded as a PIC. On the other hand, a consideration is not relevant just because one of the 20 KIWs mentions it in passing. Aside from KC15, all considerations appear in at least four of the 20 KIWs. The only consideration that does not get discussed enough to validate its importance is KC15, which only gets discussed in Paper ID2. Paper ID2 is an overview of the literature on incentives by Prendergast (1999). KC15 (Social Loafing or Free Riding) is in fact a form of a dysfunctional behavioural response and a subsection of KC5. This will be discussed in more detail in the next subsection.

5.4.3) Analysis of Findings (Figure 5-1 – C3)

This subsection analyses the considerations noted in the previous subsection.

The findings shown on Table 5-12 were analysed to finalise the PICs. It was found that two of the KCs, while relevant and important, are not PICs and that one of the KCs is a subsection of another KC. The reasoning behind this is as follows:

- Note 1 – KC9 (Moral Hazard): "Moral Hazard refers to the problem of inducing agents [employees] to supply proper amounts of productive inputs when their actions cannot be observed and contracted for directly" (Holmström, 1982, p. 324). It follows that the source of this Moral Hazard or incentive problem is an asymmetry of information among individuals (Holmström, 1979). Moral Hazard is intrinsically part of the problem statement. The implementation of incentives is aimed at reducing Moral Hazard by aligning the employer and the employee's goals and by inspiring or motivating the employee to increase her or his level of performance.
- Note 2 – KC8 (Job Design): Job Design is not a consideration that needs to be taken into account when an incentive plan is designed. It is, however, a potent tool that can be used to influence considerations, such as Job Complexity, Performance Measurability, Team Production, Autonomy, Perceived Competence, Relatedness/Purpose, Gaming/Multitasking, and Intrinsic Motivation. Authors in the Key Influential Works (KIWs) assert that "job design is an important instrument for the control of incentives" (Holmström & Milgrom, 1991, p. 25). Job Design can be used to manipulate various facets of a job such as the allocation of authority (Prendergast, 1999), the grouping of tasks (Holmström & Milgrom, 1991), and the repetitiveness of work (Hackman & Oldham, 1976). This allows it to influence the various PICs.
- Note 3 – KC15 (Social Loafing or Free Riding): Social Loafing or Free Riding is not a PIC but a subsection of Gaming/Multitasking (KC5): The fact that Social Loafing or Free Riding did not have many occurrences in the KIWs is partly due to the fact that it is discussed in conjunction with Team Production and labelled as a dysfunctional behavioral response or form of Gaming/Multitasking. Gaming/Multitasking is defined as "the exploitation of an incentive scheme by an agent [employee] for his own self-interest, to the detriment of the objectives of the incentive designer" and has many forms, including diversion of effort, exploitation of rules, and distortion of choices (Ederer, Holden, & Meyer, 2013, p. 1). Social loafing is when an employee exploits the incentive plan in the interest of exercising less effort, which is in the employee's own self-interest but not that of the incentive designer. It is akin to a 'diversion of effort'. Social Loafing or Free Riding is thus not deemed a PIC but a subsection of Gaming/Multitasking.

The most important incentive plan design considerations or PICs that have to be taken into account as per the KIWs in the domain are thus concluded to be: Autonomy, Career Concerns, Perceived Competence, Employee Risk Characteristics, Gaming or Multitasking, Intrinsic Motivation, Job Complexity, Perceived Fairness, Performance Measurability, Relatedness/Purpose, Risk to Employee, Selection Effects, and Team Production. Job Design, while not a PIC itself, was identified as a tool that can and should be used to influence many of the PICs. This is illustrated in Figure 2-3 in Chapter 2.3.2, and followed by a definition of each of the PICs (note that minor refinements are made in terms of terminology as discussed in the following subsection). A detailed description of each PIC can be found in Appendix A.1.

5.4.4) Comparison of PICs with ad hoc Findings

This subsection compares the PICs with the initial ad-hoc findings.

The results from the structured process can be compared to initial ad hoc findings (i-PICs) to test the robustness of the structured process. Note that the i-PICs are the result of a lengthy iterative ad hoc development process that considered more than 300 relevant papers which contained two thirds of the 59 Key Influential Works (KIWs - see Figure 5-3). It would thus be expected that the i-PICs would be well developed, even though this cannot be objectively demonstrated. It was found that the structured literature review was able to identify the considerations noted in the i-PICs. While slight modifications were made to the initial model, the comparison demonstrated the maturity of the iterative ad hoc model and suggests that the structured process was able to provide a realistic representation of the state of affairs.

When the i-PICs and the considerations from the structured literature review (KCs) were compared, five variances were noted. They are highlighted by the red circles labelled A to E in Figure 5-10:

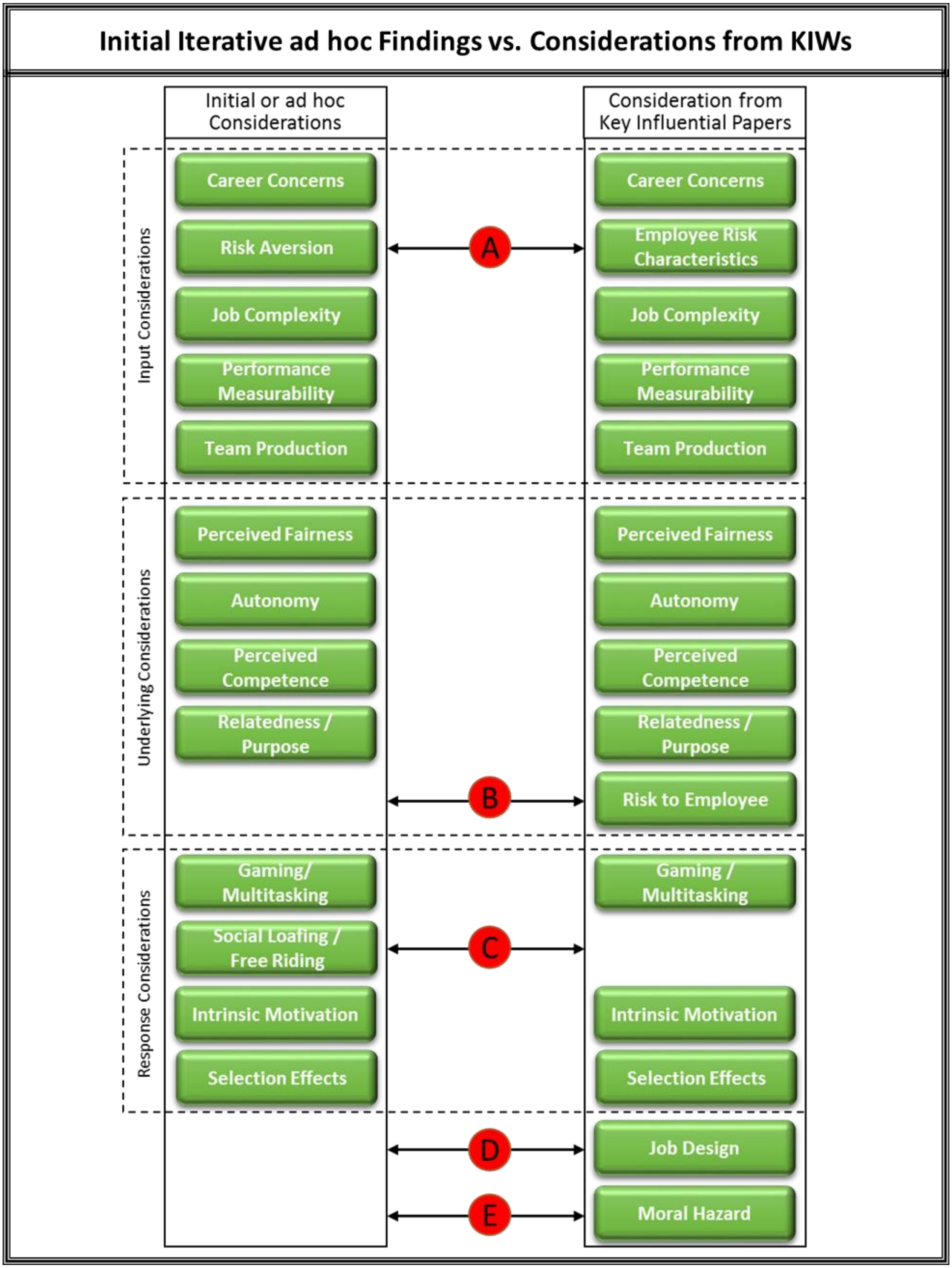


Figure 5-10: The discrepancies between the initial iterative ad-hoc findings and the considerations from the Key Influential Works

The five variances are as follows:

Variance A: Terminology – "Risk Aversion" vs. "Employee Risk Characteristics"

Under input considerations the KCs have 'Employee Risk Characteristics' whereas the i-PICs have 'Risk Aversion'. As a starting point the definition or meaning behind the two terms must clarified:

- Risk Aversion (i-PICs' definition): "The reluctance of a person to accept a bargain with an uncertain payoff rather than another bargain with a more certain, but possibly lower, expected payoff." This was discussed in relation to agents or employees. The consideration is not truly focused on risk aversion exclusively but on how the agent or employee feels about or responds to risk. The reason that the consideration was called 'Risk Aversion' instead of something like 'employee risk characteristics' was due to fact that risk neutrality is an accepted ex-hypothesis (Rabin & Thraler, 2001). The focus is thus on how risk averse an employee is, rather than whether the employee is risk averse or not.
- Employee Risk Characteristics (KCs' definition): Employee risk characteristics was identified by terms such as: "Risk neutral", "Attitudes to risk", "Willingness to take risks", "Risk aversion", "Agent may be too cautious", "Risk tolerances", and "Agent's ability to handle risk" (see KC4 on Table 5-11). These terms or phrases were in relation to agents or employees. They have to do with how the agent or employee feels about and handles risk.

It is thus clear that while the i-PICs and KCs' definition or terminology varies they deal with the same phenomena. It must thus be decided what term is the clearest, most descriptive, and most helpful to use. It is interesting to note that 'risk aversion' is one of the phrases or terms used to identify 'employee risk characteristics'; this is because the level of risk aversion is one of the primary facets of an employee's risk characteristics. While this PIC mostly deals with risk aversion the overall issue at hand is the effect risk has on an employee; hence 'employee risk characteristics' is considered. It is thus seemingly more accurate to talk about 'employee risk characteristics', yet it is not necessarily the clearest or most helpful term to use. Out of the 20 KIWs, 11 refer to 'risk aversion' and none of them refer to 'employee risk characteristics'. 'Risk Aversion' is not only the term most widely used, it also focuses the reader's or user's attention on the phenomena that are the focus of this consideration. In order to make it clear that we are not generically talking about risk aversion, but specifically risk aversion in relation to the agent or employee, the term "Agent's Level of Risk Aversion" is used to describe this input consideration. The mechanics behind the consideration allow for other facets of employee risk characteristics such as risk seeking or risk neutrality assumptions.

In conclusion the phrase "Agent's Level of Risk Aversion" is used instead of "Risk Aversion" or "Employee Risk Characteristics".

Variance B: Structure – "Risk to Employee" as an underlying consideration

Under underlying considerations the KCs have "Risk to Employee", the i-PICs have no counterpart in this case. Risk to employees was defined by the following terms; "Risk sharing", "Imposing risk on workers", "Principal's risk profile", "Unwanted risk", "Risk constraints", "Guarantees", "Risk and incentives", "Risk allocation". This consideration is concerned with the amount of risk that an employee or agent will be exposed to. It can be controlled via the design of an incentive plan or even by the design of a job itself. While the i-PICs have no counterpart for "Risk to Employees" under underlying considerations it was addressed with risk aversion under input considerations. It does however make sense to distinguish between the two. The Agent's Level of Risk Aversion is independent of the inherent risk in a job or the risk created by an incentive plan. The risk to the employee can however be controlled during the design of an incentive plan and can even be altered through Job Design. The Agent's Level of Risk Aversion thus informs the design decision with regards to risk to employee. There are clearly two considerations that need to be made; one is an input consideration and the other is an underlying consideration (see Chapter 2.3.2). The usability of the model would improve if this distinction were to be made. This does not change the underlying theory behind the i-PICs but does structure the model in a more logical way. In order to be consistent the term "Risk to Agent" is used instead of the term "Risk to Employee".

In conclusion, the PICs include the consideration "Risk to Agent" as an underlying consideration. While the i-PICs included the arguments under the input consideration "Risk Aversion", separating them improves the clarity and usability of the model.

Variance C: Structure – "Social Loafing/Free Riding" is not a PIC

See note 3 in the previous subsection. In conclusion, "Social Loafing/Free Riding" is not incorporated into the model as a PIC. It is dealt with as a subsection of "Gaming/Multitasking".

Variance D: Structure – "Job Design" is not a PIC

See note 2 in the previous subsection. In conclusion, "Job Design" is not included as a PIC. It is rather a tool that can be used to shape various PICs which could enable or improve the use or effectiveness of Incentive Mechanisms.

Variance E: Structure – "Moral Hazard" is not a PIC

See note 2 in the previous subsection. In conclusion "Moral Hazard" is not a PIC. It is intrinsically part of the principal agent problem and problem statement.

5.5) An Overview of the PICs (As Listed and Described in Appendix A.1)

This subsection provides an overview of the PICs and the descriptive list of PICs.

In order to understand where the PICs fit into the overall picture with regard to incentive plans and employee motivation it is necessary for a quick overview. The basic premise is that organisational performance can be improved by enhancing employee performance; employee performance can be enhanced by stimulating Discretionary Behaviour, and Discretionary Behaviour can be stimulated by applying the correct incentive plan (see Figure 1-1 and the discussion that followed). Applying the correct incentive plan includes, but is not limited to, an appropriate use of Incentive Mechanisms; integration with PICs and a use of Job Design is part and parcel of the overall process necessary to design an effective incentive plan. This is illustrated in Figure 5-11:

Figure 5-11: PICs in relation to Incentive Mechanism as a tool to improve organisational performance

The identification and description (Chapter 5 and Appendix A.1) of the 13 PICs is followed by the identification and description of Incentive Mechanisms (Chapter 6), after which Job Design is reviewed (Chapter 7). After these three components are in place they can be related to each other (SECTION C).

The PICs are defined as: "The most important considerations that need to be taken into account when an incentive plan is designed". The PICs are arranged into three categories:

- **Input Considerations**: Input considerations can be thought of as the pieces of the puzzle that define the playing field for an incentive plan. They describe the situation and personnel where the incentive plan is to be implemented. These input considerations will thus be different for different jobs or workplaces as well as individuals.
- **Underlying Considerations**: Underlying considerations are those considerations that need to be taken into account in any situation. While every job might not allow each of them to be perfectly satisfied they act as an amplification factor; the better they are designed for, the better the overall resulting motivation will be.

- **Response Considerations**: Response considerations can be thought of as the response of the agent to the Incentive Mechanisms. This can be both consciously or subconsciously and positive or negative. Response considerations are thus something of a measure of the successfulness of an incentive plan. Yet they need to be well-understood so that the Incentive Mechanisms can be designed in such a way that they are positive.

Figure 5-12 shows the 13 PICs with each PIC's designation. This can be used to refer to the descriptive list of PICs documented in Appendix A.1.

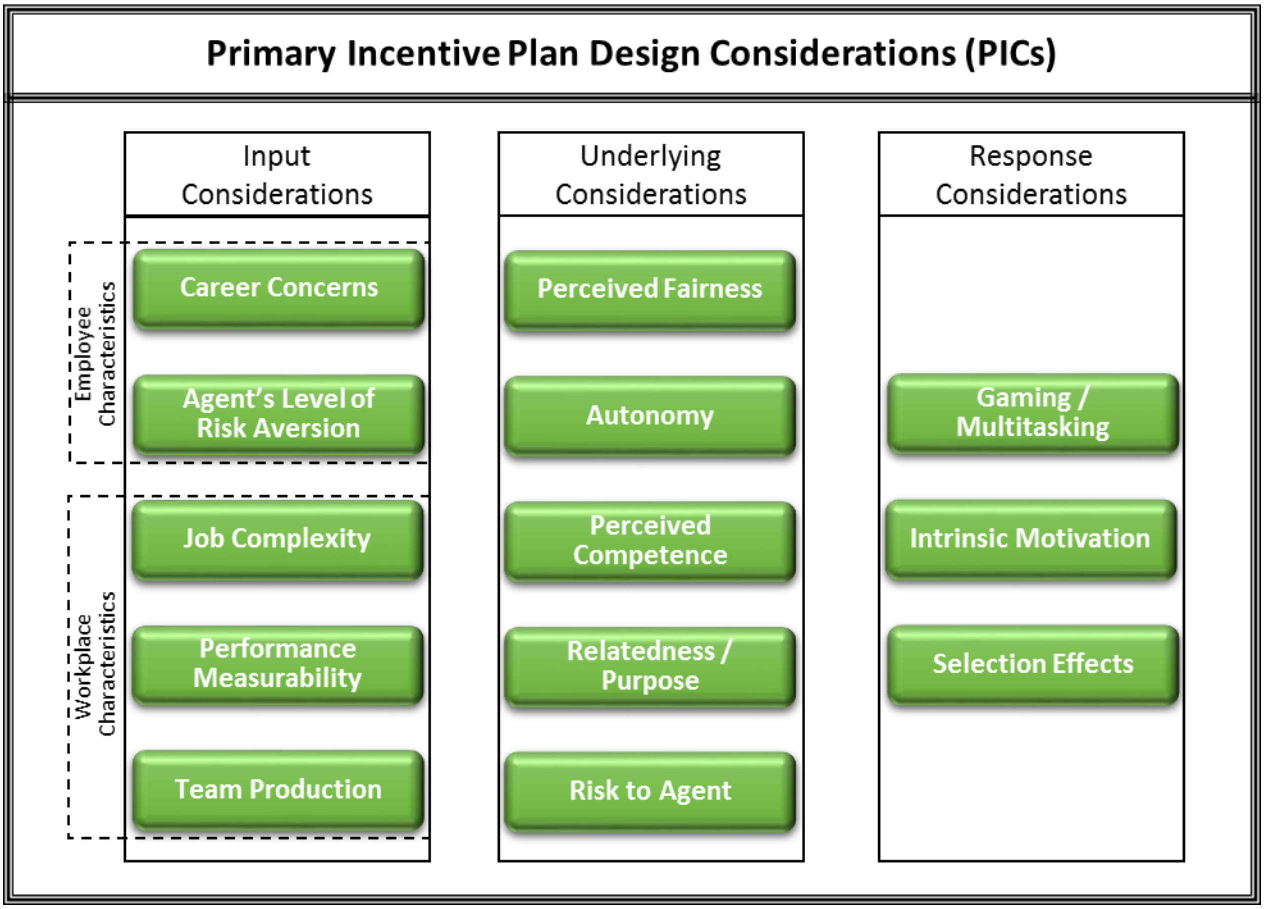


Figure 5-12: Primary Incentive Plan Design Considerations (PICs) with designations

5.6) Summary and Conclusion

This subsection concludes Chapter 5: PICs According to a Structured Literature Review.

The structured literature review identified 13 PICs. Job Design, while not a primary consideration, was recognised as a potent tool that can be used to significantly influence many of these considerations. The PICs are sorted into three categories:

- Input Considerations: Career Concerns, Agent's Level of Risk Aversion, Job Complexity, Performance Measurability, and Team Production.
- Underlying Considerations: Perceived Fairness, Autonomy, Perceived Competence, Relatedness/Purpose, and Risk to Agent.
- Response Considerations: Gaming/Multitasking, Intrinsic Motivation, and Selection Effects.

A systematic approach was required as, in addition to the literature being extensive and multidisciplinary, researchers can easily be streamlined into certain schools of thought through confirmation bias. It is thus noteworthy that the items on the list testify that the structured review process was successful in not limiting itself to a specific field. The structured literature review suggests that both extrinsic and intrinsic considerations should be taken into account.

Since the PICs were extracted from the Key Influential Works (KIWs), the identification of the KIWs is an important phase. The reliability of this process is validated by considering the results retrospectively. The data from the top ten ranked KIWs are not extended by the data from the second ten; when each consideration on Table 5-12 is individually considered the second ten papers do a very good job of mirroring the first ten.

It is important to note that the results in this chapter represent a snapshot in time of the theoretical landscape with regards to incentives and employee motivation. It is possible that the theoretical landscape will evolve or develop in the coming decades. The process designed to determine the 13 PICs can be repeated at any time to reflect such development.

Chapter 6: Incentive Mechanisms (IMs)

"The one issue that should be considered by all organization theories is the relationship between pay and performance."

-Edward E Lawler III

6.1) Introduction

This subsection introduces Chapter 6: Incentive Mechanisms.

Incentive Mechanisms (IMs) have to be identified and described so that they can be related to the PICs and incorporated into the DSS. The purpose of this chapter is not to compile an exhaustive list of all the possible IM options and configurations available to designers. The types of IM that are available to designers or that organisations typically use will be identified and described. This is to be supplemented by knowledge gleaned from the 20 Key Influential Works. Focusing on the typical IMs, and breaking them down into the typical Features of Incentive Mechanisms (see Chapter 6.5), allows the relationships or links between the IMs and PICs to be identified in a meaningful fashion.

Chapter 6 introduces IMs, identifies the various types of IMs that are typically used in organisations, and provides a description for each type of IM. This is followed by a list and description of FIMs. This chapter is structured as follows:

- Chapter 6.1) Introduction
- Chapter 6.2) Background
    - Incentive Mechanisms are introduced and placed in context.
- Chapter 6.3) Identification of Incentive Mechanisms
    - The typical types of Incentive Mechanisms are identified.
- Chapter 6.4) An Overview of the List of the Types of IMs (listed and described in Appendix A.2)
    - An overview of the list of the types of Incentive Mechanism is provided.
- Chapter 6.5) The Features of Incentive Mechanisms (as listed and described in Appendix A.3)
    - The concept of Features of Incentive Mechanisms is introduced.
- Chapter 6.6) Summary

6.2) Background

This subsection introduces Incentive Mechanisms and places them in context.

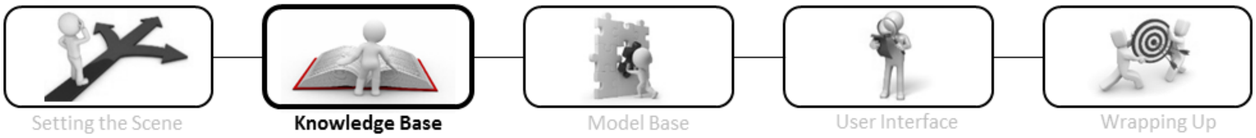
6.2.1) An Overview of Incentive Mechanisms

Incentive Mechanisms (IMs), sometimes called instruments, are the devices that are typically used to build an incentive plan. While variable pay or pay for performance configurations are typical IMs, “the range of instruments that can be used to control an agent's performance in one activity is much wider than just deciding how to pay for performance. One can also shift ownership of related assets, vary restrictions on the ways a job can be done, vary limits and incentives for competing activities, group related tasks into a single job, and so on” (Holmström & Milgrom, 1991, p. 50)**.** A typical IM has to specify:

- how it will Measure Performance.
- what Performance Requirements are necessary for a reward.
- what type of Reward it will employ.
- what audience it will target.

These are later referred to as the Features of Incentive Mechanisms (FIMs).

Job Design, referred to in the quote above, is not included as an IM. While Job Design can be used to create an environment that enhances employee motivation or increases the effectiveness of IMs it is not an IM itself. The Element of Job Design is identified and described in Chapter 7. IMs are those mechanisms that seek to influence an employee’s behaviour, often by providing some favourable outcome contingent on a certain type of behaviour.



6.2.2) Incentive Mechanisms in Context

In order to understand where Incentive Mechanisms fit into the overall picture with regard to incentive plans and employee motivation a quick overview is necessary. The basic premise is that organisational performance can be improved by enhancing employee performance. Employee performance can be enhanced by stimulating Discretionary Behaviour, and Discretionary Behaviour can be stimulated by applying the correct incentive plan (see Figure 1-1 and the discussion that follows it). Applying the correct incentive plan includes, but is not limited to, an appropriate use of Incentive Mechanisms; integration with PICs and a use of Job Design is part and parcel of the overall process necessary to design an effective incentive plan. This is illustrated in Figure 6-1:

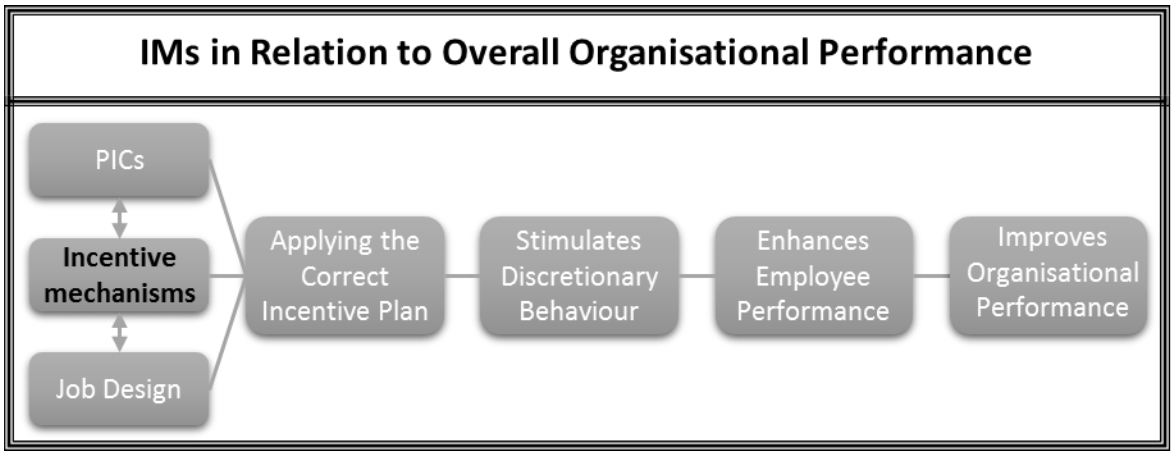
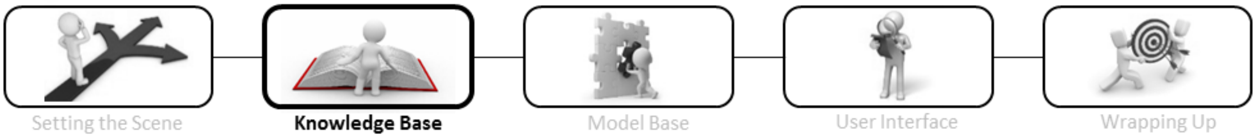


Figure 6-1: Incentive Mechanisms as a tool to improve organisational performance

The PICs have been identified and defined (Chapter 5 and Appendix A.1). This chapter identifies and describes the available Incentive Mechanisms. This is followed by a review of the Elements of Job Design in Chapter 7. After these three components are in place they can be related to each other (SECTION C).



6.3) Identification of Incentive Mechanisms

This subsection identifies the typical Incentive Mechanisms. Textbooks and online sources are used, and supplemented with findings from the Key Influential Works. Seven types of IMs are identified.

6.3.1) Approach

The purpose of this chapter is not to compile an exhaustive list of all the possible Incentive Mechanism options and configurations available to designers. Such a list would reduce the usability of the DSS with an overload of information. Instead the types of Incentive Mechanisms (IMs) that are available to designers or that organisations typically use were identified and described. This was supplemented by knowledge gleaned from the 20 Key Influential Works. Focusing on the typical IMs, and breaking them down into the typical Features of Incentive Mechanisms (see Chapter 6.5), allowed relationships between the IMs and PICs to be identified in a meaningful fashion. While an in-depth study was not required, a clear and structured methodology was followed to ensure that results were objective and reliable.

6.3.2) Incentive Mechanisms from Public Domain (textbooks and online sources)

The mechanisms from the public domain, or the typical Incentive Mechanisms as can be found in text books or in online sources, were considered first. Six textbooks and two online sources were considered. They are shown in Table 6-1:

Table 6-1: List of sources in the public domain

#	Type	Name	Reference
1	Textbook	Human Resource Management: A managerial perspective	(Cornelius, 2001)
2	Textbook	Human Resource Management: Gaining a Competitive Advantage	(Noe, Hollenbeck, Gerhart, & Wright, 2006)
3	Textbook	Strategic Human Resource Management	(Mello, 2002)
4	Textbook	Human Resource Management: Essential Perspectives	(Mathis & Jackson, 2002)
5	Textbook	Human Resource Management	(Nel, et al., 2008)
6	Textbook	Pay-for-Performance Plans	(McGraw-Hill/Irwin, 2002)
7	Website	HR-Guide.com	(HR-Guide.com, 2015)
8	Website	CIPD	(CIPD, 2015)

The IMs that were found in these sources are broken down in Figure 6-2.

6.3.3) Incentive Mechanisms from Key Influential Works (KIWs)

The mechanisms that are prevalent in the public domain cover most of the available Incentive Mechanisms (IMs). Considering the Key Influential Works (KIWs) served both as a control for the findings, and was used to identify additional IMs that should be considered. As stated, the list of incentives was not meant to be exhaustive, yet suggestions from the KIWs that were not easily obtained from the public domain and helped to develop a more robust and useful artefact were considered.

The IMs that can be found in the 20 KIWs (see Table 5-10) are broken down in Figure 6-3.

Typical Incentive Mechanisms as found in the Public Domain

(Cornelius, 2001)	(Noe, Hollenbeck, Gerhart, & Wright, 2006)	(Mello, 2002)	(Mathis & Jackson, 2002)	(Nel, et al., 2008)	(McGraw-Hill/Irwin, 2002)	(HR-Guide.com, 2015)	(CIPD, 2015)	Overview
Profit Sharing	Profit Sharing Gain Sharing	Profit Sharing	Gainsharing Profit Sharing	Profit-Sharing Bonuses	Cash Profit Sharing Gain-Sharing Plans	Gainsharing Profit Sharing	Gainsharing Business Results Based Site/Department Based	Profit-sharing & Gainsharing
Merit Pay	Merit Pay				Merit Pay	Merit Pay		Merit Pay
Share Options	Ownership	Stock Options	ESOPs	Restricted Shares Share Options and Ownership	Stock Option Plans	Stock Options ESOP	Business Results Driven Schemes	Ownership and Shares
	Incentive Pay	Commission	Piece Rates & Sales Commission				Sales Commission	Piece Rates & Commission
Individual Bonuses Team Bonuses		Bonus	Bonuses		Individual Incentive Plans Team Awards		Individual Based Bonus Team Based Bonus	Bonuses (Ind. & Team)
	Efficiency Wages Skill Based		Special Recognition	Recognition	Special Recognition Plans		Non Cash Incentives Recognition Schemes Combination	Recognition

Figure 6-2: The typical Incentive Mechanisms as found in the public domain arranged by type

Incentive Mechanisms as found in the Key Influential Works (KIWs)

KIW-7	KIW-6	KIW-11	KIW-2	KIW-9	KIW-21	KIW-36	KIW-37	KIW-20	KIW-19	KIW-10	KIW-15	KIW-5	KIW-13	KIW-25	Overview
	Piece Rates	Piece Rates	Piece Rates				Commissions	Performance Plans	Piece Rates	Commissions Piece Rate Pay	Piece Rates	Piece Rates	Commission Piece Rates		**Piece Rates & Commission**
Bonuses			Discretionary Bonuses Profit-sharing	Tangible Rewards	Money as Reward External Reward	Rewards		Bonus Plans		Bonuses		Bonuses	Bonuses	Cash Rewards Profit-sharing	**Bonuses and Rewards**
	Procedural Autonomy	Vary Restrictions		Choice		Directives Imposed Goals Autonomy									**Autonomy**
Stock Options	Asset Ownership		Options				Stock Options Firm Ownership	Non-Qualified Stock Options Restricted Stock Stock Appreciation Rights				Asset Ownership	Stock Ownership Partnerships		**Ownership and Stock Options**
Salary Revisions			Efficiency Wages Salary Revisions Deferred Compensation				Salary	Deferred Salary				Future Compensation	Merit Pay	Efficiency Wages	**Salary Schemes**
				Positive Feedback (Verbal)	Positive Feedback (Verbal)	Acknowledgement of Feelings Feedback (Positive and Negative)								Praise Recognition Holiday Bonuses	**Recognition and Praise**
Dismissals			Promotions	Threats and Deadlines		Threats Deadlines	Promotions					Continued Employment Promotions		Rewards and Punishments Promotion Based Incentive Systems	**Promotions and Dismissals**

Figure 6-3: The typical Incentive Mechanisms as found in the Key Influential Works arranged by type

6.3.4) Findings

The results from the survey of the public domain and that of the gleanings from the Key Influential Works (KIWs) were combined as shown in Figure 6-4:

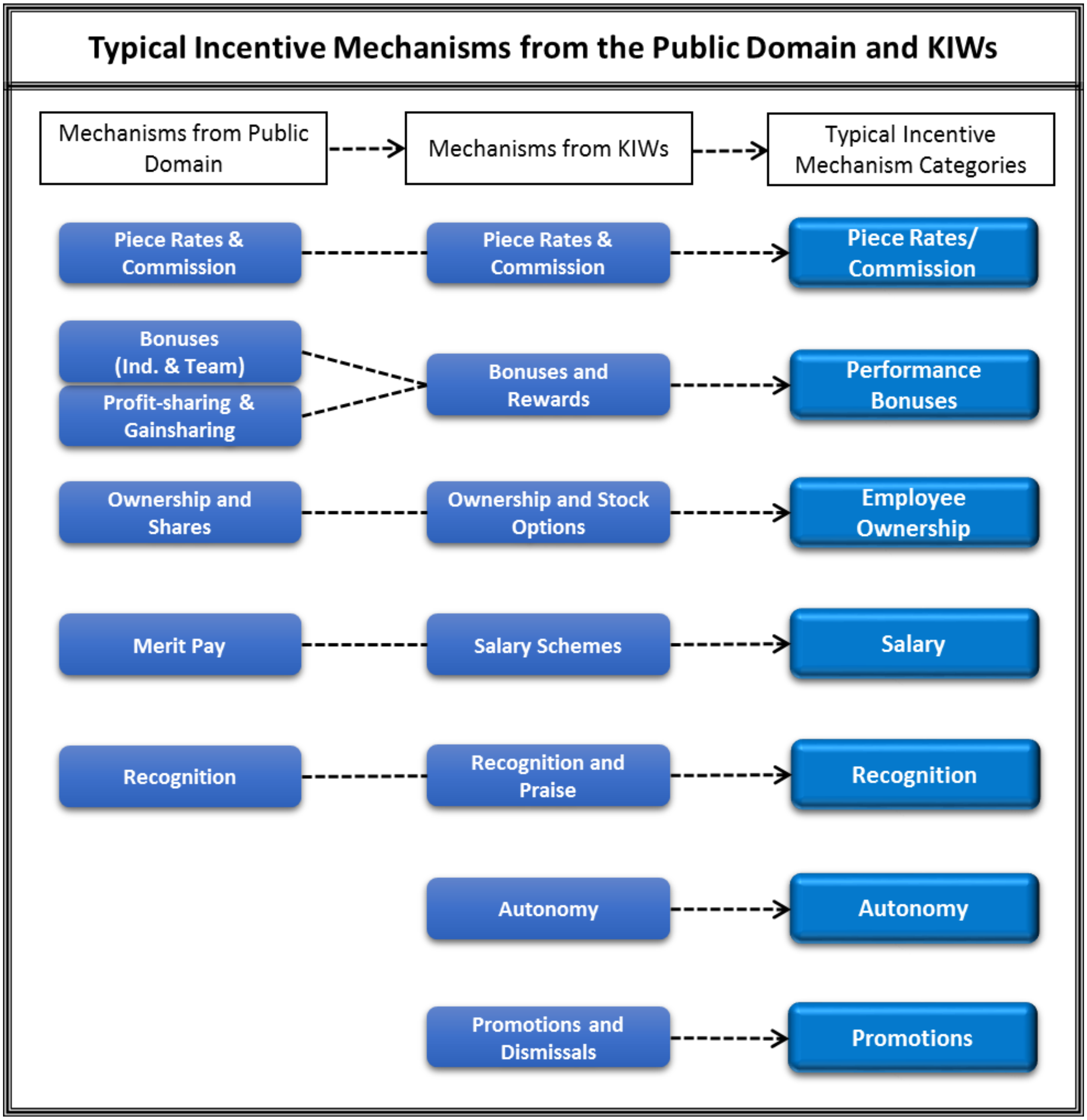


Figure 6-4: Typical Incentive Mechanisms determined by considering the public domain and Key Influential Works

There is a very good correlation between the two lists. This is encouraging as it suggests that practitioners and academics do relate to each other to a significant degree. The two mechanisms that were not plain in the surveys of the public domain, 'Autonomy' and 'Promotions', are nevertheless frequently used, though not necessarily as part of an official strategy, policy, or even consciously. A contribution can be made to the public domain by highlighting these mechanisms and describing how they function as

Incentive Mechanisms. Even though they might already be widely used, their effectiveness can only increase if practitioners appreciate what effects their implementation has and how they relate to the PICs.

The seven categories that were studied, on the right-hand side of Figure 6-4, have some subcategories that are worth describing. These can be found by studying Figure 6-2 and Figure 6-3. The seven categories and their significant subcategories that were incorporated into the DSS are shown in Figure 6-5:

IM1 - Piece Rates/Commission

IM2 - Performance Bonuses

- IM2.1 - Gainsharing
- IM2.2 - Profit-sharing

IM3 - Employee Ownership

- IM3.1 - Stock Options
- IM3.2 - Employee Stock Ownership Plans (ESOPs)
- IM3.3 - Asset Ownership

IM4 - Salary

- IM4.1 - Merit Pay
- IM4.2 - Efficiency Wages
- IM4.3 - Deferred Compensation

IM5 - Recognition

- IM5.1 - Positive Feedback

IM6 - Autonomy

IM7 - Promotions

- IM7.1 - Dismissals

Figure 6-5: Typical Incentive Mechanisms and their significant subcategories

6.4) An Overview of the List of the Types of IMs (As Listed and Described in Appendix A.2)

This subsection provides an overview of the list of the types of Incentive Mechanisms.

An overview of the types of Incentive Mechanisms (IMs) can be found in Figure 6-6.

The definition of each of the IMs, and their subcategories (see Figure 6-5), can be found in Appendix A.2. Note that the definitions are not accompanied by extensive descriptions. In order to reduce repetition the reader is referred to the Cascading Effects Models (CEMs) that can be found in Chapter 15.3, and the related IM–FIM Links that can be found in Appendix B.4. The format of the list, as found in Appendix A.2, is as follows:

[Node Designation)] [<u>Name of IM</u>]
[Definition] [Location of more information]
[Timing]

- Notable Strengths or Weaknesses (not related to PICs directly).

An Overview of the Typical Types of Incentive Mechanisms					
Incentive Mechanisms	**Definition**	**The Payment Itself**	**Performance Measurement**	**Goals or Checkpoints**	**Timing**
Piece Rates/ Commission	A way of paying for work that is based on a fixed rate according to a physical measurement of units produced or actions performed.	Money as remuneration, on top of base salary, or a mixture.	Objective physical measurement of 'units' produced.	Each 'unit' produced typically. Differential or quota plus options are available.	Paid with wages.
Performance Bonuses	A once-off bonus in addition to base pay based on an assessment of performance.	A once-off, typically monetary payment, on top of base pay.	Various subjective and objective measures as well as a mixture of the two.	Ratings or milestones.	Various
Employee Ownership	Employee Ownership refers to the ownership of a company, directly or indirectly, in part or in whole by some or all of its employees.	A portion of the business, its shares or its assets.	Business value or share price.	Linear based on business (only on positive side for share options).	Various according to type. Can be annually, like profit sharing typically is, or more long term.
Salary	A fixed regular payment, typically paid on a monthly basis, made by an employer to an employee, especially a professional or white-collar worker.	Cash	Various	Various	Various according to type. From annually for merit pay to continuous with efficiency wages.
Recognition	The expressed appreciation for an employee's behaviours, activities or impact in an organisation in the form of simple gestures as well as symbolically through the receiving of an award.	Recognition in the form of: Praise and Emblematic Rewards, Token Rewards, or Monetary Rewards	Objective, Subjective, or a mixture.	Not defined.	Various
Autonomy	Increasing an employee's level of autonomy as a reward for good performance.	Increased levels of autonomy.	Not defined.	Not defined.	Not defined.
Promotions	The advancement of an employee's rank or position in an organisational hierarchy system.	A promotion.	Objective and Subjective	Often tournament theory related	Only available when a position is open or can be created.

Figure 6-6: An overview of the typical types of Incentive Mechanisms

6.5) The Features of Incentive Mechanisms (As Listed and Described in Appendix A.3)

This subsection introduces the concept of Features of Incentive Mechanisms.

In order to reduce the complexity of the DSS, typical Features of Incentive Mechanisms (FIMs) are identified. This allows the links between the typical features of each IM and the PICs to be drawn only once. Typically an IM has to specify:

- how it will Measure Performance;
- what Performance Requirements are necessary for a reward;
- what type of Reward it will employ;
- what audience it will target.

It follows that each IM has to approach certain features in a specific way. The four Features of Incentive Mechanisms that need to be addressed are:

FIM1) Performance Measures (objective or subjective).
FIM2) Performance Requirements (linear and non-linear, plus FIM2.1: tournaments/relative).
FIM3) Reward Types (tangible or intangible).
FIM4) Target Audience (individual or team-based).

Each of the FIMs typically falls somewhere on a continuum between two extremes. An explanation of what each of the FIMs entails can be found in Appendix A.3.

The format of the list is as follows:
[Node Designation)] [Name of FIM]: [Extreme 1 – Extreme 2]
[Short Description]: [More Details]

- [Extreme 1]
  - [Opportunities/Strengths]
  - [Threats/Weaknesses]
- [Extreme 2]
  - [Opportunities/Strengths]
  - [Threats/Weaknesses]

6.6) Summary

This subsection concludes Chapter 6: Incentive Mechanisms.

This chapter identified and described seven categories and subcategories, of Incentive Mechanisms (IMs):

- IM1 – Piece Rates/Commission
- IM2 – Performance Bonuses
    - IM2.1 – Gainsharing
    - IM2.2 – Profit-sharing
- IM3 – Employee Ownership
    - IM3.1 – Stock Options
    - IM3.2 – Employee Stock Ownership Plans (ESOPs)
    - IM3.3 – Asset Ownership
- IM4 – Salary
    - IM4.1 – Merit Pay
    - IM4.2 – Efficiency Wages
    - IM4.3 – Deferred Compensation
- IM5 – Recognition
    - IM5.1 – Positive Feedback
- IM6 – Autonomy
- IM7 – Promotions
    - IM7.1 – Dismissals

IM1 to IM5 were found in both a survey of the public domain and in the Key Influential Works (KIWs). The two mechanisms that were not plain in the surveys of the public domain, 'Autonomy' and 'Promotions', are nevertheless frequently used, though not necessarily as part of an official strategy, policy, or even consciously. A contribution can be made to the public domain by highlighting these mechanisms and describing how they function as Incentive Mechanisms. Even though they might already be widely used, their effectiveness can only increase if practitioners appreciate what effects their implementation has and how they relate to the PICs.

In order to reduce the complexity of the DSS, typical Features of Incentive Mechanisms were identified. This allows the links between the typical features of each IM and the PICs to be drawn only once. The four Features of Incentive Mechanisms (FIMs) that need to be addressed are:

FIM1) Performance Measures (objective or subjective).
FIM2) Performance Requirements (linear and non-linear, plus FIM2.1: tournaments/relative).
FIM3) Reward Types (tangible or intangible).
FIM4) Target Audience (individual or team-based).

Chapter 7: Elements of Job Design (EJD)

"To Design work without carefully considering the changes that will be in the reward system is likely to lead to inappropriate choices. At the same time, implementing reward systems while taking the design of the task as given will miss important opportunities to enhance performance by altering work designs."

-(Wageman & Baker, 1997, p. 157)

7.1) Introduction

This subsection introduces Chapter 7: Elements of Job Design.

The main components of the DSS are the PICs and Incentive Mechanisms. Job Design, while not a primary consideration, was recognised in the structured literature review as a potent tool that can be used to significantly influence many of these considerations. Job Design is recognised by leading authors in the area of incentives and employee motivation as a tool that should be used in tandem with Incentive Mechanisms.

Chapter 7 introduces and defines Job Design, identifies the various Elements of Job Design (EJD), and provides a description for each EJD. This chapter is structured as follows:

- Chapter 7.1) Introduction
- Chapter 7.2) Background
    - The EJD are introduced and placed in context.
- Chapter 7.3) Identification of the Elements of Job Design (EJD)
    - The Elements of Job Design are identified.
- Chapter 7.4) An Overview of the List of the EJD (as listed and described in Appendix A.4)
    - An overview of the list of the Elements of Job Design is provided.
- Chapter 7.5) Summary

7.2) Background

This subsection introduces the Elements of Job Design and places them in context.

7.2.1) An Overview of Job Design: A Brief Literature Review

Job Design is defined as "the study, creation, and modification of the composition, content, structure, and environment within which jobs and roles are enacted" (Morgeson & Humphrey, 2008, p. 47). In order to provide the necessary background to understand what Job Design entails and why the Morgeson & Humphrey definition is adopted, the history and development of Job Design is examined.

A detailed history of the development of Job Design is outside the scope of this research. Here follows a brief overview intended to give the reader enough background to understand the basic dimensions of Job Design. Readers who require more details can start their investigation with the works of Hackman & Oldham (1976), Morgeson & Humphrey (2008), and Grant, Fried, & Juillera (2010). It would not be unreasonable to posit that Job Design has been around as long as organised work; the Egyptians, for example, had specialised roles throughout their society as well as for building the great pyramids (Andreu, 1997). "Principles of work design were first codified in the works of Smith (1776) and Babage (1835) who forwarded the notion of a division of labor and articulated how such a division could enhance productivity and efficiency" (Morgeson & Humphrey, 2008, p. 43). Frederick Winslow Taylor's 1911 monograph *'The Principles of Scientific Management'* created techniques to simplify work to its basic elements (Taylor, 1911). The twentieth century saw the development of theories that included Intrinsic Motivation; Herzberg et al.'s Hygiene theory (also called two-factor theory) identified motivators, which were intrinsic features of the job leading to job satisfaction, and hygiene factors, which were features of broader work context such as supervisory considerations and work conditions (Herzberg, Mausner, Peterson, & Capwell, 1957). While this theory, suggesting that job satisfaction and dissatisfaction had different causes, has been heavily criticised, it set the course for the next 40 years of work design research as primarily focusing on intrinsic job features to the detriment of research on the role of interpersonal relationships and work context (Morgeson & Humphrey, 2008, p. 44). It was in this period, about two decades after the formulation of the Hygiene theory, that Hackman and Oldham developed 'The Job Characteristics Model' which has been "extremely influential and has dominated the area of work design" (Morgeson & Humphrey, 2008, p. 45). This claim seems reasonable as when the literature on Job Design is reviewed, whether in an explorative or systematic manner, the 1976 paper by Hackman and Oldham 'Motivation through the Design of Work: Test of a Theory' summarily comes to the forefront. This paper presented The Job Characteristics Model: "five 'core' job dimensions are seen as prompting three psychological states which, in turn, lead to a number of beneficial personal and work outcomes" (Hackman & Oldham, 1976, p. 255). Note that 'The Job Characteristics Model' ignores the social environment and broader work context. While research has expanded beyond The Job Characteristics Model's "narrow set of intrinsic job features", "it is only relatively recently that a comprehensive account of intrinsic and extrinsic work design elements have been offered" (Morgeson & Humphrey, 2008, p. 45).

Hackman and Oldham (1980) defined Job Design four decades ago as the set of opportunities and constraints structured into assigned tasks and responsibilities that affect how an employee accomplishes and experiences work, “today, job design is defined more broadly as encapsulating the processes and outcomes of how work is structured, organized, experienced, and enacted” (Grant, Fried, & Juillerat, 2010, p. 418). Morgeson and Humphrey (2008) considered various definitions about not only Job Design but also about elements of jobs and teams in an effort to provide a comprehensive definition as given at the start of this subsection. In light of the history and development of the field and the Elements of Job Design considered below, Morgeson and Humphrey’s definition (2008) is deemed suitable and adopted.

7.2.2) Job Design in Context

The main components of the DSS are the PICs and Incentive Mechanisms. Job Design is something of an anomaly. While it is not a PIC or an Incentive Mechanism, it is a potent tool that could be used to shape various PICs and could enable or improve the use or effectiveness of Incentive Mechanisms. Job Design is recognised by leading authors in the area of incentives and employee motivation as a tool that should be used in tandem with Incentive Mechanisms. This is clear even when considering endorsements only from Key Influential Works:

- Holmström & Milgrom (1991, p. 25) asserted that “job design is an important instrument in the control of incentives”.
- Gibbons (1998, p. 120) recognised that “it is often helpful to use multiple instruments to provide a balanced package of incentives, and useful instruments range from direct cash payments to indirect organizational policies such as promotion criteria and job design.”
- Hackman & Oldham (1976, p. 250) postulated that “Work redesign is becoming increasingly prominent as a strategy for attempting to improve simultaneously the productivity and the quality of the work experience of employees in contemporary organizations.”

In order to understand where Job Design fits into the overall picture with regard to incentive plans and employee motivation it is necessary for a quick overview. The basic premise is that organisational performance can be improved by enhancing employee performance, employee performance can be enhanced by stimulating Discretionary Behaviour, and Discretionary Behaviour can be stimulated by applying the correct incentive plan (see Figure 1-1 and the discussion that follows it). Applying the correct incentive plan includes, but is not limited to, an appropriate use of Incentive Mechanisms; integration with PICs and a use of Job Design is part and parcel of the overall process necessary to design an effective incentive plan. This is illustrated in Figure 7-1:

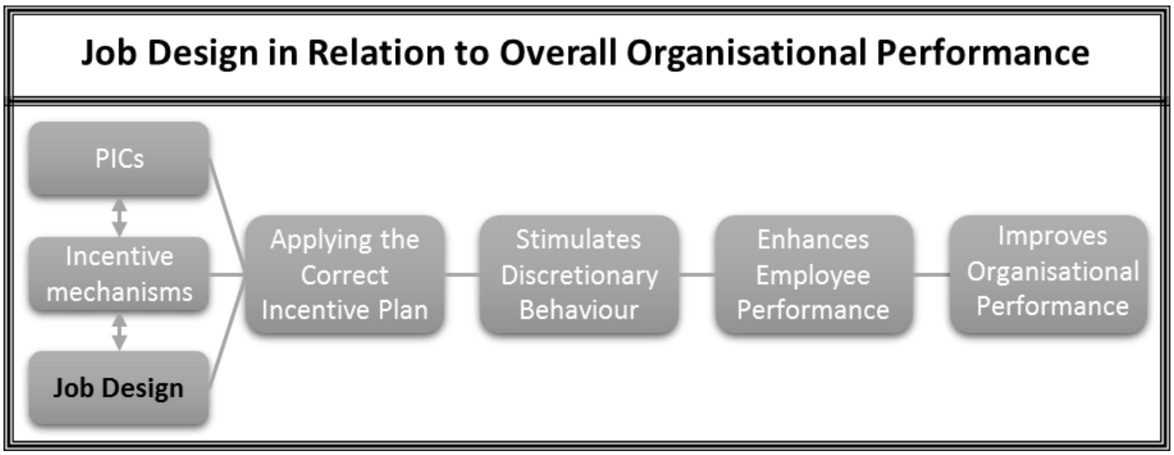


Figure 7-1: Job Design in relation to Incentive Mechanisms as a tool to improve organisational performance

The PICs have been identified and defined (Chapter 5 and Appendix A.1), and the typical Incentive Mechanisms have been identified and described (Chapter 6). This chapter identifies the Elements of Job Design. With this done the three main building blocks that the DSS is built upon are in place and can be related to each other (SECTION C).

7.3) Identification of the Elements of Job Design (EJD)

This subsection identifies the Elements of Job Design.

This subsection identifies the Elements of Job Design (EJD). The influential Job Characteristics Model of Hackman & Oldham (1976) was considered, yet due to its limitations it was necessary to look at contemporary models as well. The integrative models of Morgeson & Humphrey (2008), and Grant, Fried, & Juillerat (2010) were thus considered as well. As a final check the summarised elements from the three models were compared to the multidisciplinary approach taken by Campion & Thayer (1987).

7.3.1) The Job Characteristics Model - (Hackman & Oldham, 1976)

The Job Characteristics Model, which has been "extremely influential and has dominated the area of work design" (Morgeson & Humphrey, 2008, p. 45), is considered first. Note that this 1976 production of Hackman and Oldham ignored the social environment and broader work context. "At the most general level, five 'core' job dimensions are seen as prompting three psychological states which, in turn, lead to a number of beneficial personal and work outcomes" (Hackman & Oldham, 1976, p. 255). The five core dimensions are listed and described as:

- Skill Variety: "The degree to which a job requires a variety of different activities in carrying out the work, which involve the use of a number of different skills and talents of the person."
- Task Identify: "The degree to which the job requires completion of a 'whole' and identifiable piece of work; that is, doing a job from beginning to end with a visible outcome."
- Task Significance: "The degree to which the job has a substantial impact on the lives or work of other people, whether in the immediate organization or in the external environment."
- Autonomy: "The degree to which the job provides substantial freedom, independence, and discretion to the individual in scheduling the work and in determining the procedures to be used in carrying it out."
- Feedback: "The degree to which carrying out the work activities required by the job results in the individual obtaining direct and clear information about the effectiveness of his or her performance."

It is clear that these core dimension are areas that can be controlled by Job Design. The psychological states that are prompted by these core dimensions are given and described as:

- Experienced Meaningfulness of the Work (Prompted by Skill Variety, Task Identify, and Task Significance): "The degree to which the individual experiences the job as one which is generally meaningful, valuable, and worthwhile."
- Experienced Responsibility for Outcomes of the Work (Prompted by Autonomy): "The degree to which the individual feels personally accountable and responsible for the results of the work he or she does."
- Knowledge of the Actual Results of the Work (Prompted by Feedback): "The degree to which the individual knows and understands, on a continuous basis, how effectively he or she is performing the job."

These psychological states can thus be stimulated by manipulating the five core dimensions. The psychological states are further argued to lead to the following beneficial personal and work outcomes:

- high Internal Work Motivation;
- high Quality Work Performance;
- high Satisfaction with the Work;
- low Absenteeism and Turnover.

This is illustrated by Hackman and Oldham (1976) in Figure 7-2:

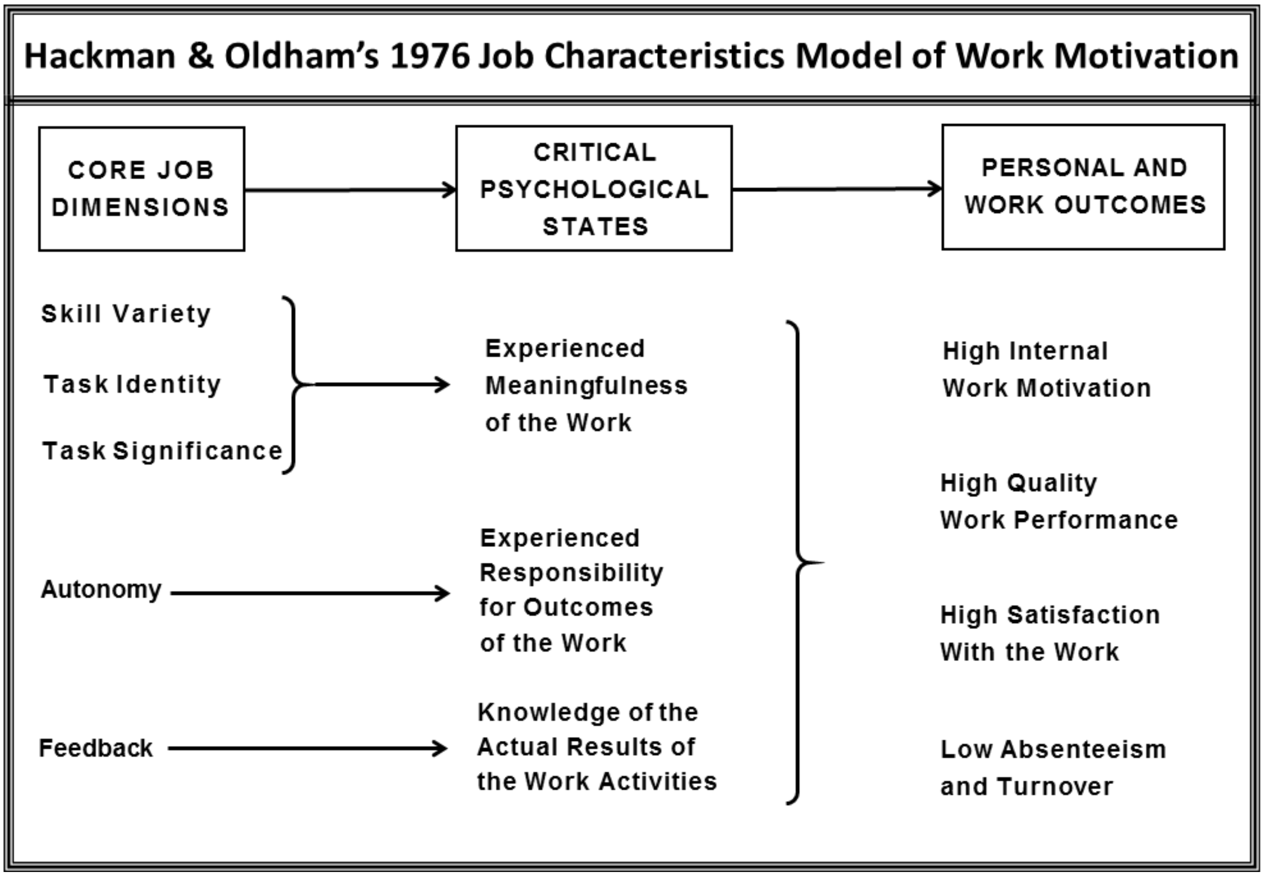


Figure 7-2: The job characteristics model of work motivation (Hackman & Oldham, 1976) – digitally enhanced

Job Design can hence be used to influence the five core dimensions; Skill Variety, Task Identity, Task Significance, Autonomy, and Feedback.

7.3.2) Integrative Model of Work Design: Work Characteristics - (Morgeson & Humphrey, 2008)

As part of the process of developing a model of work design that integrates job and team design, Morgeson and Humphrey (2008, p. 50) identified task, social, and contextual sources or work characteristics:

- "Task Characteristics arise from the task environment or the work itself."
- "Social characteristics emerge from the social environment or when working with others."
- "Contextual characteristics emerge from the physical and organizational environment."

They list the specific characteristics in Figure 7-3:

Morgeson & Humphrey's 2008 Work Characteristics by Source

Task

- Autonomy
- Task variety
- Significance
- Task identity
- Feedback from the job
- Job complexity
- Information processing
- Problem solving
- Skill variety
- Specialization

Social

- Social support
- Feedback from others
- Interdependence
  - Between jobs/roles
  - Between teams
  - Feedback, rewards, and goals
- Interaction outside the organization

Contextual

- Physical demands
- Work conditions
- Ergonomics
- Equipment use
- Boundary spanning
- Organizational support
  - Reward systems
  - Information systems
  - Training systems
  - Resource availability
  - Managerial support
- Virtuality of work
- Consequence of failure

Figure 7-3: Work Characteristics by Source (Morgeson & Humphrey, 2008) – digitally enhanced

Job Design can influence all of these characteristics. The only exception seems to be 'consequence of failure'.

These work characteristics are to be used to drive different outcomes. Morgeson and Humphrey (2008) group the outcomes into five categories; attitudinal, behavioural, cognitive, well-being, and organisational.

7.3.3) Classic & Contemporary Perspective: Job Characteristics - (Grant, Fried, & Juillerat, 2010)

Grant, Fried, & Juillerat (2010) identified classic and contemporary perspectives of Job Design and provided a summary model to integrate them. The collection of job characteristics is more extensive than that of Hackman & Oldham (1976) or Morgeson & Humphrey (2008) as discussed above. While the primary focus in relation to the final artefact is the job characteristics, an understanding of why these characteristics are important and what effects they have will increase the usability of the model. Instead of only listing Grant, Fried, & Juillerat's (2010) Job Characteristics, their 'integrative model of job design' is included in Figure 7-4 to give the reader the necessary context of how the job characteristics function:

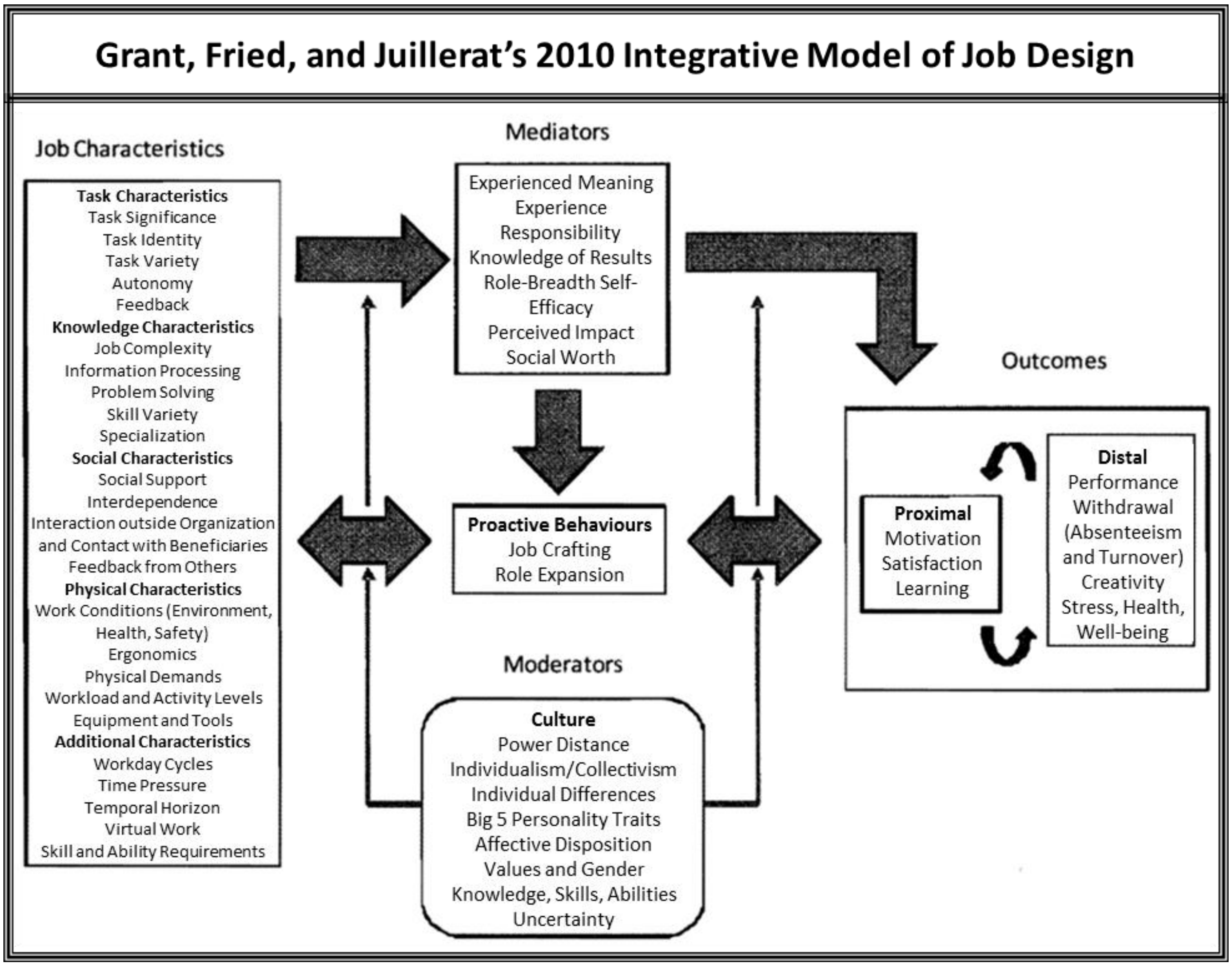


Figure 7-4: An integrative model of Job Design (Grant, Fried, & Juillerat, 2010, p. 427) – digitally enhanced

This model "can be divided into two general categories: (a) new job characteristics and (b) new moderators, mediators, and outcomes of Job Design. These developments are directed toward overcoming the narrow focus of the JCM [Job Characteristics Model] on only five job characteristics, three psychological mechanisms, and four outcomes of motivation; satisfaction, performance, and withdrawal behaviors" (Grant, Fried, & Juillerat, 2010, p. 426). While broadening the scope of job characteristics in relation to Morgeson & Humphrey (2008), this model or paper does not give clear guidance on how important these characteristics are, or how they should be configured. Many of them are obvious; improved Ergonomics is naturally desirable, yet others are not; is a higher degree of virtual work, Specialisation, or Job Complexity good or bad, and under what circumstances? Readers can refer to Grant, Fried, & Juillerat (2010) for more details on the five categories of job characteristics, the motivators, moderators, and outcomes shown in Figure 7-4.

7.3.4) A Summary of Job Design Characteristics

The elements, as identified in the previous subsections, are summarised and amalgamated in Figure 7-5.

As with the Incentive Mechanisms (IMs), as discussed in Chapter 6.3.1, the list of EJD is not intended to be exhaustive. Elements that are not well defined or which significantly overlap with other elements were disregarded. The elements were divided into four categories: Task/Job, Skill/Knowledge, Social, and Physical. An explanation of why certain elements, marked with red dots and numbered in Figure 7-5, are disregarded follow:

- 1 – Consequences of Failure: Defined as “The degree to which incorrect task performance results in negative consequences” (Morgeson & Humphrey, 2008, p. 66). It might be argued that the Incentive Mechanisms are a part of the ‘environment’ part of Job Design. Whether this is the case or not, this aspect of a job is catered for through the Incentive Mechanisms.
- 2 – Workday Cycles: This encompasses focusing on designing workdays rather than jobs or tasks and involves how tasks are sequenced throughout the course of a day; variety and complexity, and alternating complex and routine tasks (Grant, Fried, & Juillerat, 2010). This approach certainly stimulates focus on various subtle aspects of Job Design, yet it is too specialised and more likely to confuse than expand the usefulness of a basic model. Most of these considerations are covered under Autonomy, Task Variety, Task Identity, Job Complexity, Specialisation, Skill Variety and Workload. The focus with the EJD is towards identifying basic levers that can be used in conjunction with, and to improve the effectiveness of, Incentive Mechanisms.
- 3 – Time Pressure: Grant, Fried, & Juillerat (2010, p. 437) suggested that time pressure may be included as a Temporal Job Characteristic; “job features that influence the time horizons on which employees complete work”. As above, this specialised approach will not be included and is covered under Workload and Scheduling Autonomy.
- 4 – Temporal Horizon: See point three. Temporal Horizon is also not well defined; “may be one category worth adding, especially as technological advances continue to fuel faster performance and cycle times” (Grant, Fried, & Juillerat, 2010, p. 437).
- 5 – Skill and Ability Requirements: Grant, Fried, & Juillerat (2010, p. 440) state that “there is a need to develop a theoretical conceptualization of skill and ability characteristics, which will capture what employees are trained and able to do, as opposed to simply what they know.” As this aspect is conceptual and covered by aspects such as Job Complexity, Specialisation, and Skill Variety it will not be included.

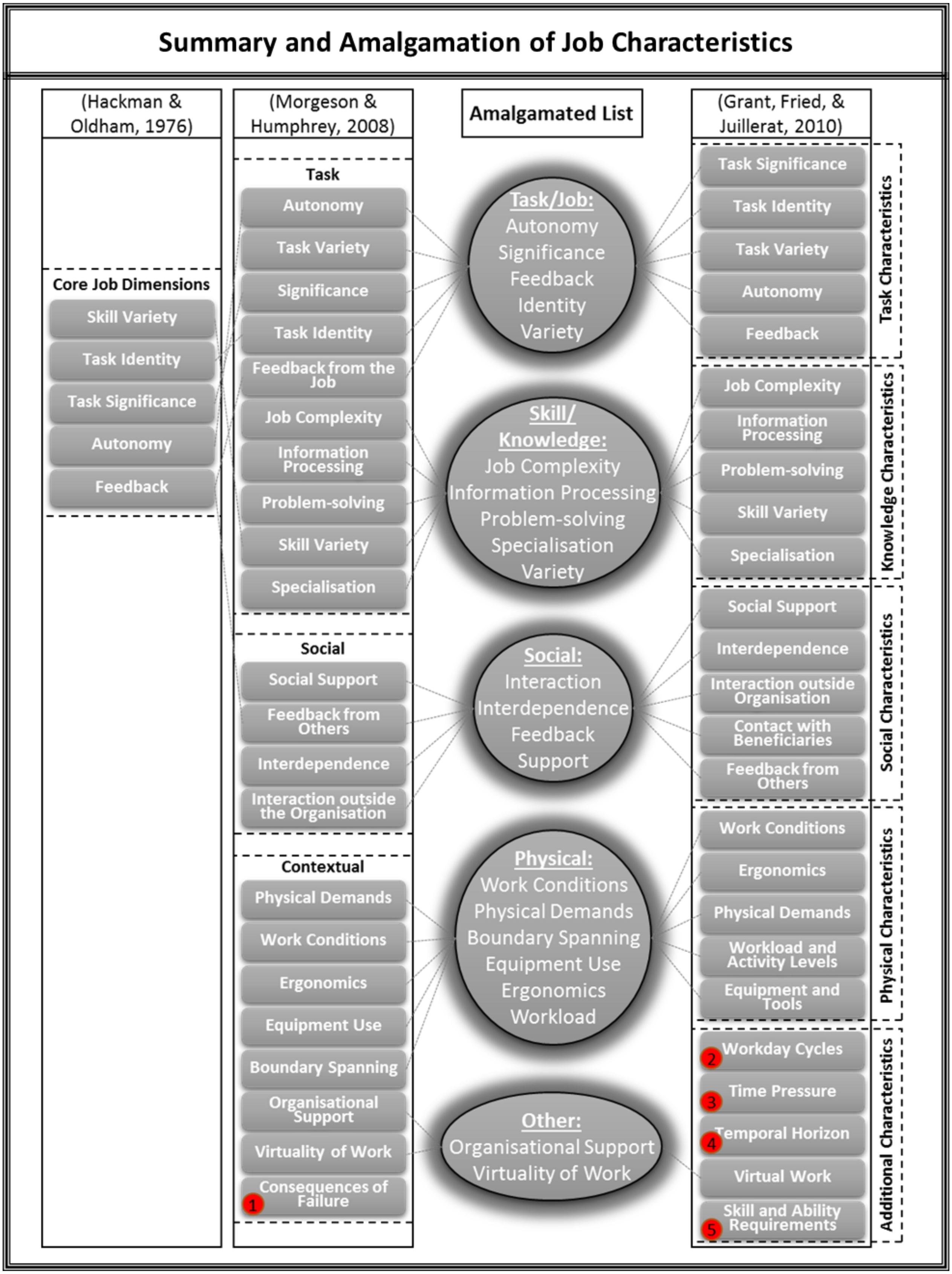


Figure 7-5: A summary of the elements or characteristics of Job Design

7.3.5) EJD Assessment: A Multidisciplinary Approach to Job Design - (Campion & Thayer, 1987)

The comprehensiveness of the collection of elements above can be tested against various constructs. In order to do this a 48-item questionnaire, the multidisciplinary approach to Job Design, by Campion & Thayer (1987) was selected. This work is considered as an alternative approach to job design (Nelson & Quick, 2012). It is maintained that "many of the premises of this theory have been supported" (Jex & Britt, 2014, p. 326), and it has been widely used in the world of Occupational Sciences and Industrial/Occupational Psychology. The questionnaire is based on an "exhaustive search of the literature". It is multidisciplinary and extensive; it is thus an appropriate tool to use when testing the comprehensiveness of the findings above.

Campion & Thayer's (1987) multidisciplinary approach to Job Design identifies four different approaches. The 48-item questionnaire follows these four approaches. Table 7-1 lists the 48 questions alongside a description of the approach the questions are associated with.

Table 7-1: The 48-item questionnaire of the multidisciplinary approach to Job Design by Campion & Thayer (1987)

#	Question
A	The Mechanistic Job-Design Approach: "This approach stems from the scientific management school of thought, time and motion study, and work simplification and specialization. Its primary scientific basis is classic industrial engineering. (The term classic is used because many contemporary writers include a variety of job design approaches under the label of industrial engineering.)"
A1	**Job specialization**: Is the job highly specialized in terms of purpose and/or activity?
A2	**Specialization of tools and procedures**: Are the tools, procedures, materials, etc. used on this job highly specialized in terms of purpose?
A3	**Task simplification**: Are the tasks simple and uncomplicated?
A4	**Single activities**: Does the job require the incumbent to do only one task at a time? Does it not require the incumbent to do multiple activities at one time or in very close succession?
A5	**Job simplification**: Does the job require relatively little skill and training time?
A6	**Repetition**: Does the job require performing the same activity or activities repeatedly?
A7	**Spare time**: Is there very little spare time between activities on this job?
A8	**Automation**: Are many of the activities of this job automated or assisted by automation?
B	The Motivational Job-Design Approach: "This approach stems from the work on job enrichment and enlargement and from the major theories of work motivation and organizational behaviour. Its basis is organizational psychology".
B1	**Autonomy**: Does the job allow freedom, independence, or discretion in work scheduling, sequence, methods, procedures, quality control, or other decisions?
B2	**Intrinsic job feedback**: Do the work activities themselves provide direct, clear information about the effectiveness (in terms of quality and quantity) of job performance?
B3	**Extrinsic job feedback**: Do other people in the organization (such as managers and co-workers) provide information about the effectiveness (in terms of quality and quantity) of job performance?
B4	**Social interaction**: Does the job provide for positive social interaction (such as teamwork or co-worker assistance)?
B5	**Task/goal clarity**: Are the job duties, requirements, and goals clear and specific?
B6	**Task variety**: Does the job have a variety of duties, tasks, and activities?
B7	**Task identity**: Does the job require completion of a whole and identifiable piece of work? Does it give the incumbent a chance to do an entire piece of work from beginning to end?
B8	**Ability/skill-level requirements**: Does the job require a high level of knowledge, skills, and abilities?
B9	**Ability/skill variety**: Does the job require a variety of types of knowledge, skills, and abilities?
B10	**Task significance**: Is the job significant and important compared with other jobs in the organization?

B11	**Growth/learning**: Does the job allow opportunities for learning and growth in competence and proficiency?
B12	**Promotion**: Are there opportunities for advancement to higher-level jobs?
B13	**Achievement**: Does the job provide for feelings of achievement and task accomplishment?
B14	**Participation**: Does the job allow participation in work-related decision-making?
B15	**Communication**: Does the job provide access to relevant communication channels and information flows?
B16	**Pay adequacy**: Is the pay for this job adequate compared with the job requirements and pay for similar jobs?
B17	**Recognition**: Does the job provide acknowledgment and recognition from others?
B18	**Job security**: Do incumbents on this job have a high degree of job security?
C	The Biological Job-Design Approach: "This approach is derived from the sciences of biomechanics (the study of body movements), work physiology, occupational medicine, and anthropometry (the study of body measurements). It is often called ergonomics, and its main thrust is to minimize the physical costs and biological risks of work. The goal is to ensure that people's physical capabilities and limitations are not exceeded by the design of their jobs (a consideration that is frequently ignored)."
C1	**Strength**: Does the job require fairly little muscular strength?
C2	**Lifting**: Does the job require fairly little lifting, and/or is the lifting of very light weights?
C3	**Endurance**: Does the job require fairly little muscular endurance?
C4	**Seating**: Are the seating arrangements on the job adequate (with ample opportunities to sit, comfortable chairs, good postural support, etc.)?
C5	**Size differences**: Does the workplace allow for all size differences between people in terms of clearance, reach, eye height, leg room, etc.?
C6	**Wrist movement**: Does the job allow the wrists to remain straight, without excessive movement?
C7	**Noise**: Is the workplace free from excessive noise?
C8	**Climate**: Is the climate at the workplace comfortable in terms of temperature and humidity, and is it free of excessive dust and fumes?
C9	**Work breaks**: Is there adequate time for work breaks given the demands of the job?
C10	**Shift work**: Does the job not require shift work or excessive overtime?
D	Perceptual/Motor Job-Design Approach: "The main contributors of principles to this approach are the many human-factors engineering guidelines and the research on skills and how people mentally process information. Its basis, with its emphasis on perceptual and motor abilities, is experimental psychology."
D1	**Lighting**: Is the lighting in the workplace adequate and free from glare?
D2	**Displays**: Are the displays, gauges, meters, and computerized equipment used on this job easy to read and understand?
D3	**Programs**: Are the programs in the computerized equipment for this job easy to learn and use?
D4	**Other equipment**: Is the other equipment (all types) used on this job easy to learn and use?
D5	**Printed job materials**: Are the printed materials used on this job easy to read and interpret?
D6	**Workplace layout**: Is the workplace laid out so that the employee can see and hear well enough to perform the job?
D7	**Information input requirements**: Is the amount of attention needed to perform this job fairly minimal?
D8	**Information output requirements**: Is the amount of information that the employee must output on this job, in terms of both action and communication, fairly minimal?
D9	**Information processing requirements**: Is the amount of information that must be processed, in terms of thinking and problem-solving, fairly minimal?
D10	**Memory requirements**: Is the amount of information that must be remembered on this job fairly minimal?
11	**Stress**: Is there relatively little stress on this job?
12	**Boredom**: Are the chances of boredom on this job fairly small?

The questions from these approaches can be compared with the amalgamated list of elements. This serves as a test for the reliability of the amalgamated list, can potentially be used to extend the list where is does not cover a certain aspect, and gives more insight into what some of the aspects cover. A counterpart for each item on the questionnaire is identified in the amalgamated list in Figure 7-6. The questionnaire items with no counterparts are marked in red in Figure 7-6. This may indicate shortcomings on the amalgamated list, or the concept may by covered by other means. The eight items are discussed below:

- 1 – Task/goal clarity (B5): Incentive plan design practices draw attention to task/goal clarity, and incentive plan design is to be used to set goals and checkpoints. Job design characteristics such as task identity, Task Variety, and Job Complexity can be used to manipulate task/goal clarity. No addition is made to the list in this regard.
- 2 – Growth/learning (B11): Attention is drawn to this aspect by the PIC Perceived Competence. Two factors that are considered under Perceived Competence are optimal challenges and opportunities for growth. Job design characteristics such as Task Variety, Job Complexity, Problem-solving, Skill Variety, and Workload can be used to manipulate the growth/learning aspect. No addition is made to the list in this regard.
- 3 – Promotions (B12): Attention is drawn to this aspect by the PIC Career Concerns. While none of the Job Design characteristics directly address it, promotion aspects are covered under Incentive Mechanisms. No addition is made to the list in this regard.
- 4 – Achievement (B13): Attention is drawn to this aspect by the PIC Perceived Competence. Job Design characteristics such as Task Significance, task identity, task feedback, and feedback can be used to manipulate the achievement aspect. No addition is to be made to the summary in this regard.
- 5 – Pay adequacy (B16): Attention is drawn to this aspect by the PIC Perceived Fairness. Remuneration and Incentive Mechanisms cater for pay adequacy. No addition is made to the list in this regard.
- 6 – Job security (B18): Attention is drawn to this aspect by the PICs Career Concerns, Agent's Level of Risk Aversion, and Risk to Agent. Incentive Mechanisms cater for job security. No addition is made to the list in this regard.
- 7 & 8 – Stress (D11) and Boredom (D12): Attention is drawn to these aspects by the PICs Perceived Competence and Intrinsic Motivation. Perceived Competence is defined as "feeling efficient, effective, and even masterful in one's behaviour, rather than incompetent and ineffective" (Sheldon & Filak, 2008, p. 267). Job Design characteristics such as Autonomy, Task Variety, Job Complexity, Skill Variety, and Workload can be used to manipulate these aspects. No addition is made to the list in this regard.

Testing the list of Job Design characteristics against Campion & Thayer's (1987) multidisciplinary approach to Job Design did not reveal any shortcomings. The summary shown in Figure 7-5 and Figure 7-6 was thus accepted as a reliable representation of the elements or characteristics of Job Design.

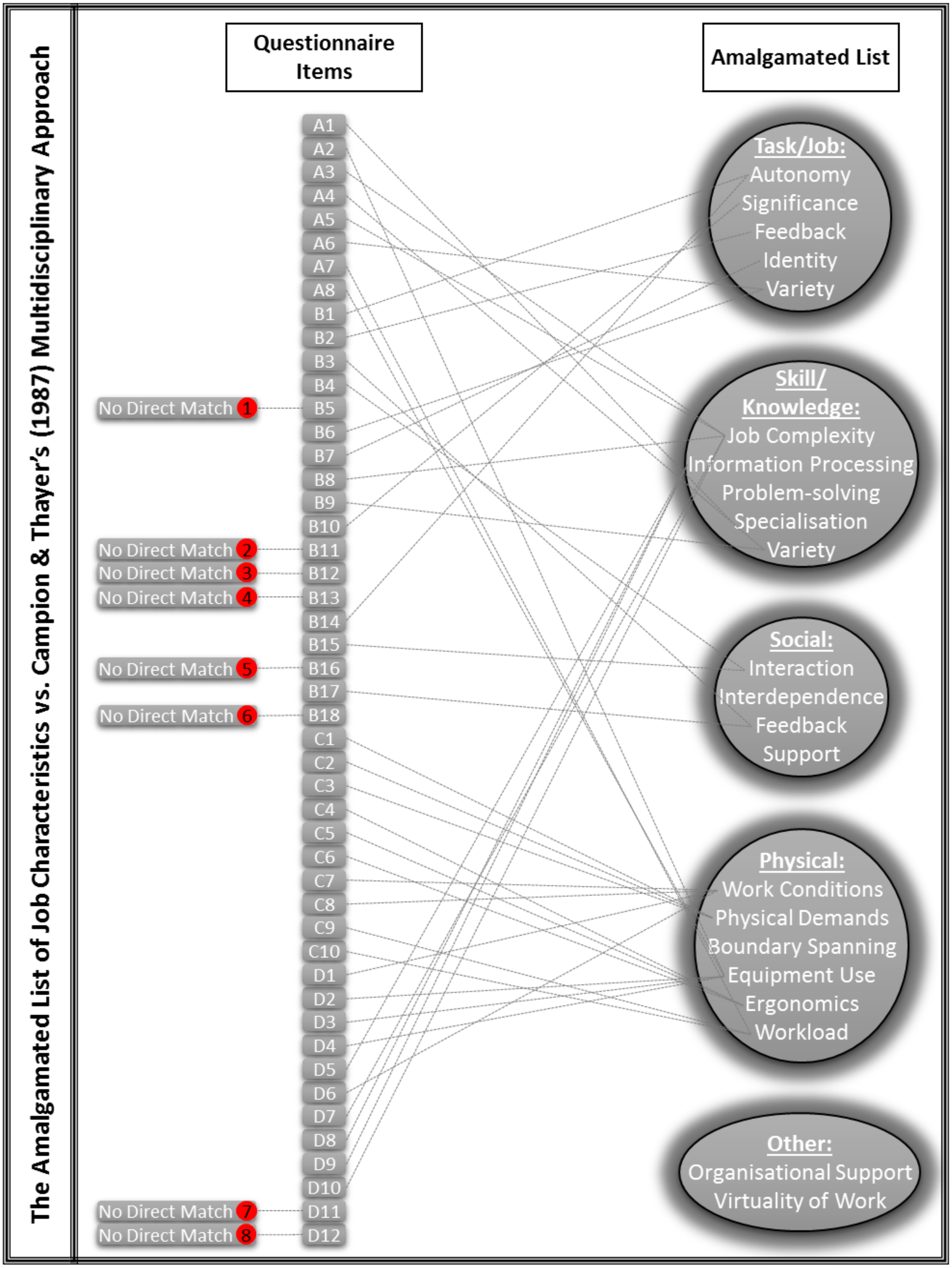


Figure 7-6: The amalgamated list of Job Characteristics vs. Campion & Thayer (1987) multidisciplinary approach to Job Design

7.4) An Overview of the List of the EJD (As Listed and Described in Appendix A.4)

This subsection provides an overview of the list of the Elements of Job Design.

A collection 22 Elements of Job Design (EJD) has been identified. Figure 7-7 shows the 22 EJD with each EJD's designation, this can be used to refer to the descriptive list in Appendix A.4. The descriptions are not meant to be comprehensive, but detailed enough to give the reader a basic understanding of what the elements or Job Design characteristics are and how they function. The definitions and descriptions are, unless stated otherwise, sourced from Morgeson & Humphrey (2008, pp. 51-68).

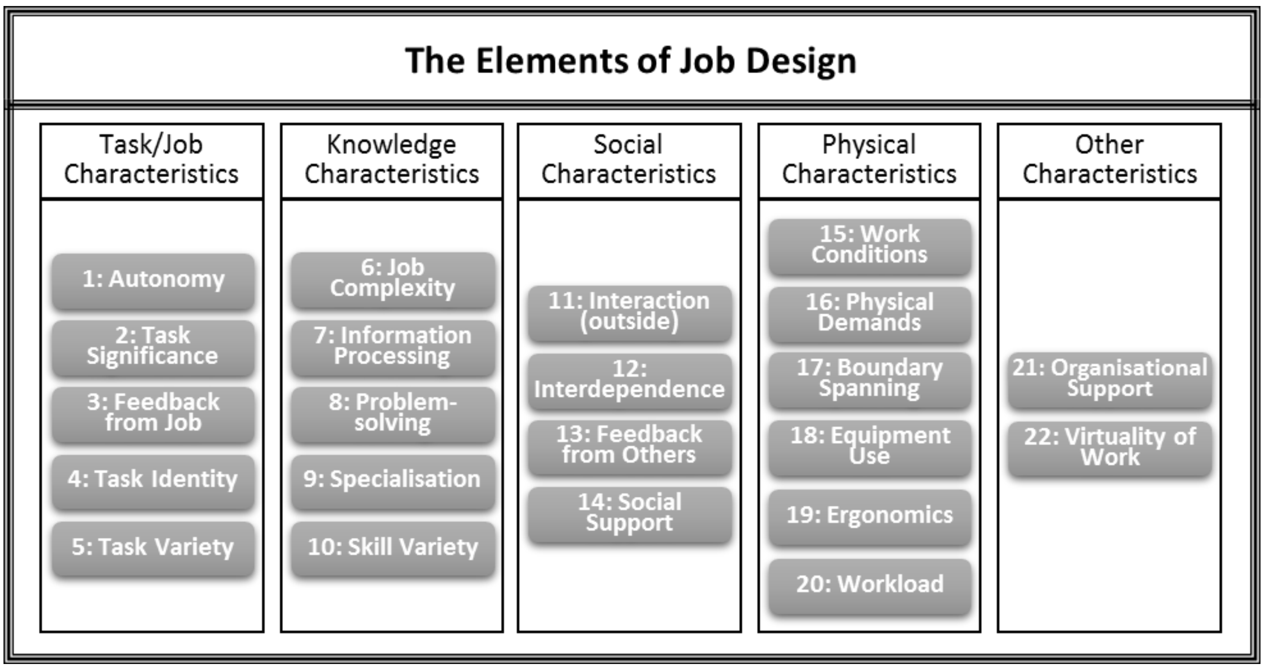


Figure 7-7: The Elements of Job Design (EJD)

The format of the list, as found in Appendix A.4, is as follows:

[Node Designation)] [<u>Name of EJD</u>]
[Short Definition] [Additional Information]

- [What the EJD is linked or associated with]

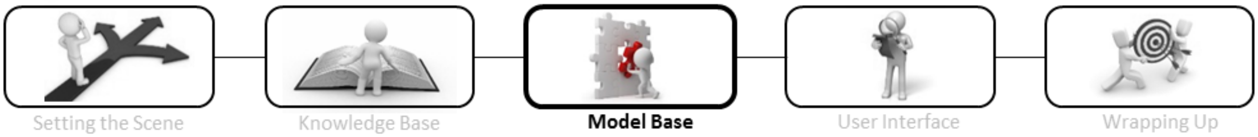
7.5) Summary

This subsection concludes Chapter 7: Elements of Job Design.

22 Elements of Job Design (EJD) were identified. The EJD, as listed in Figure 7-7, are:

- Task/Job Characteristics: Autonomy, Task Significance, Feedback from Job, Task Identify, and Task Variety.
- Knowledge Characteristics: Job Complexity, Information Processing, Problem-solving, Specialisation, and Skill Variety.
- Social Characteristics: Interaction (outside), Interdependence, Feedback from Others, and Social Support.
- Physical Characteristics: Work Conditions, Physical Demands, Boundary Spanning, Equipment Use, Ergonomics, and Workload.
- Other Characteristics: Organisational Support, and Virtually of Work.

These EJD can be used to influence PICs directly, or indirectly through the Incentive Mechanisms. Various authors of the Key Influential Works note the importance of the EJD. The use and relevance of the EJD is described well by Wageman & Baker (1997, p. 157): “To Design work without carefully considering the changes that will be in the reward system is likely to lead to inappropriate choices. At the same time, implementing reward systems while taking the design of the task as given will miss important opportunities to enhance performance by altering work designs.”



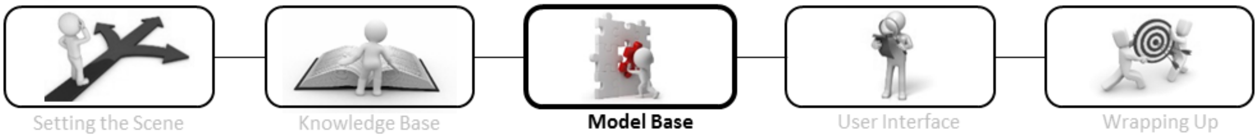
SECTION C: MODEL BASE (MB)

Chapter 8 to Chapter 12 construct the basic models that the DSS uses to help users make use of the information in the Knowledge Base (KB). In order to construct the required models the links between the PICs themselves, between the PICs and Incentive Mechanisms (IMs), between the PICs and Elements of Job Design (EJD), and between the IMs and EJD need to be identified. The processes followed in this section can be repeated at any time to reflect prospective changes in the KB due to developments in the theoretical landscape regarding employee incentives and motivation.

SECTION C[5] proceeds as follows:

- Chapter 8 provides an **Overview of the Link Models**.
- Chapter 9 determines **The Relationship between PICs** (PIC↔PIC Links).
- Chapter 10 determines **The Relationship between PICs and IMs**. FIMs are considered as well:
  - Chapter 10.2 to 10.4 provide the links between PICs and FIMs (FIM→PIC Links).
  - Chapter 10.5 to 10.8 provide the links between:
    - IMs and FIMs (IM–FIM Links).
    - IMs and PICs (IM→PIC Links).
- Chapter 11 determines **The Relationship between the EJD and PICs** (EJD→PIC Links).
- Chapter 12 determines **The Relationship between IMs and EJD** (EJD→IM Links).

[5] It must be noted that it is difficult to make a clear distinction between the KB and the Model Base (MB). As illustrated in Figure 3-3, the information behind the links could be said to be part of the KB. SECTION B identifies the PICs, IMs, and EJD, but the links are provided in SECTION C alongside the relevant link models. It must furthermore be noted that it is also difficult to make a clear distinction between the MB and User Interface (UI). Models that combine and enhance the link models into a variety of practical configurations could be said to be part of the MB, but they will be provided in SECTION D alongside the development of the UI.



Chapter 8: Overview of the Link Models

"And those who were seen dancing,

were thought to be crazy,

by those who could not hear the music."

-Friedrich Nietzsche

8.1) Introduction

This subsection introduces ***Chapter 8****: Overview of the Link Models.*

On a high level the Model Base (MB) analyses the information in the Knowledge Base (KB) and structures it in such a way that it can support decision-making. As illustrated in Figure 2-3, the PICs, Incentive Mechanisms (IMs), and Elements of Job Design (EJD) do not exist independent of one another, the links or relationships between their various elements needs to be considered in order to improve decision-making.

Chapter 8 provides an overview of the various link models that are presented in this section. This chapter is structured as follows:

- Chapter 8.1) Introduction
- Chapter 8.2) Required Link Models
    - An overview of the various link models that have to be determined.
- Chapter 8.3) Section Flow Diagram
    - An illustration of how this section proceeds.
- Chapter 8.4) Summary

8.2) Required Link Models

This subsection provides an overview of the various link models that have to be developed.

The nature of the PICs, and the manner that the Incentive Mechanisms (IMs), and Elements of Job Design (EJD) interact with the PICs, highlights the importance of considering the links between the various components of the PICs, IMs, EJD, and Features of Incentive Mechanisms (FIMs). Considerations are not to be made in isolation, it is imperative that the situation is regarded holistically. Implementing an IM or modifying an EJD does not have only one effect, but various potential cascading effects that have to be considered. In order to highlight the importance of regarding the situation holistically, or to think of the situation as an integrated system, the various nodes and the links between them are described as a complex spiderweb in the User Interface (UI) as discussed in Chapter 13.2 in Figure 13-1 and Figure 13-2. Note that certain Features of Incentive Mechanisms (FIMs) are isolated (see Chapter 6.5), and that links between the PICs themselves exist as well. Six sets of links are thus considered, and arranged into six link models. An overview of the link models is shown in Figure 8-1:

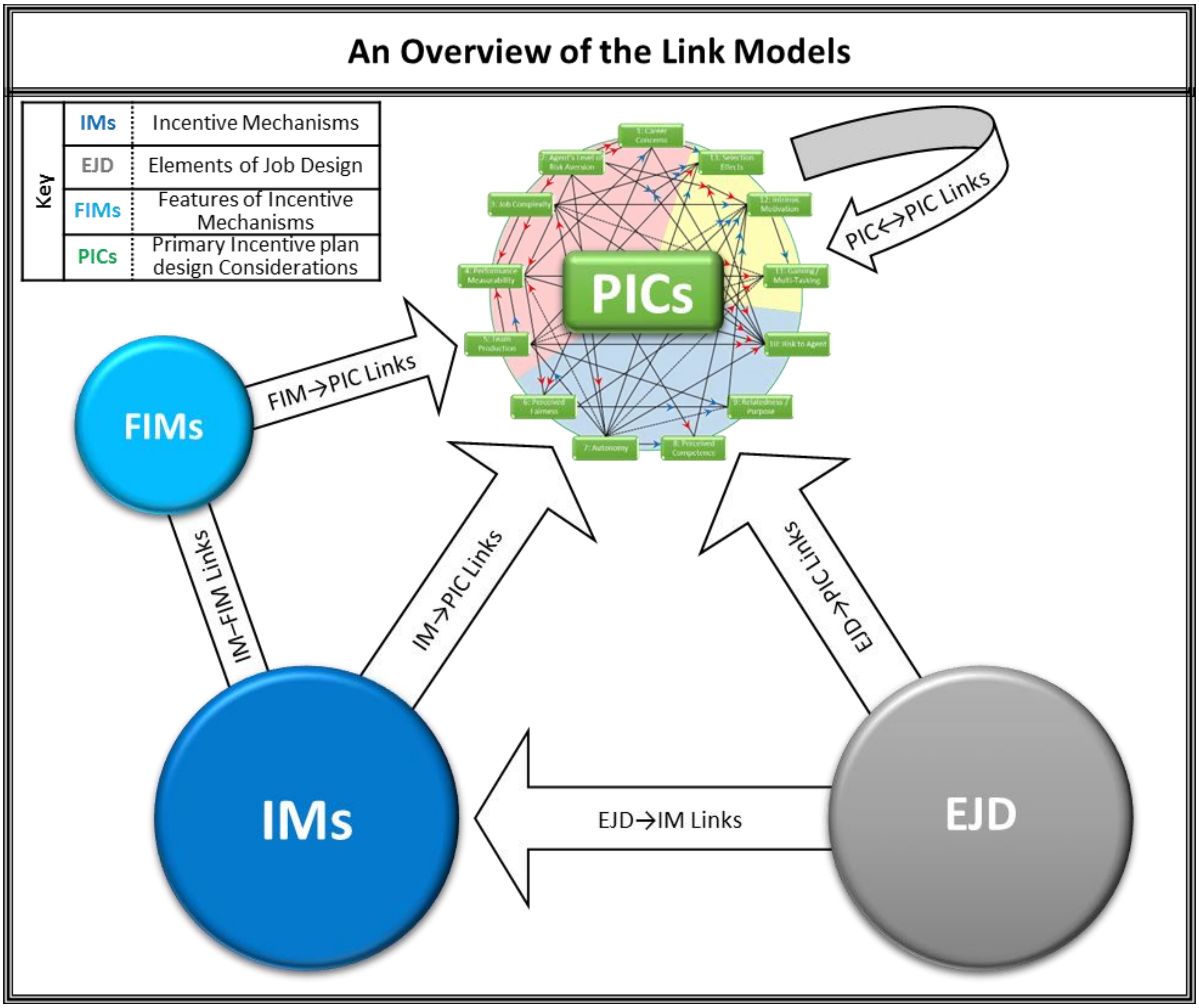


Figure 8-1: An overview of the six link models between PICs, IMs, FIMs, and EJD

The links are to be determined in as objective a manner as possible. Inferences are however necessary in some instances to complete the models; the process is recorded and presented in a transparent manner in the chapters that follow.

There are 6 link models, as illustrated in Figure 8-1, containing a total of 205 first-degree links:

- 41 PIC↔PIC Links (the links between the PICs themselves)
- 59 IM→PIC Links (the links between the PICs and IMs)
- 42 IM–FIM Links (the links between the IMs and FIMs)
- 23 FIM→PIC Links (the links between the PICs and FIMs)
- 14 EJD→IM Links (the links between the IMs and EJD)
- 26 EJD→PIC Links (the links between the PICs and EJD)

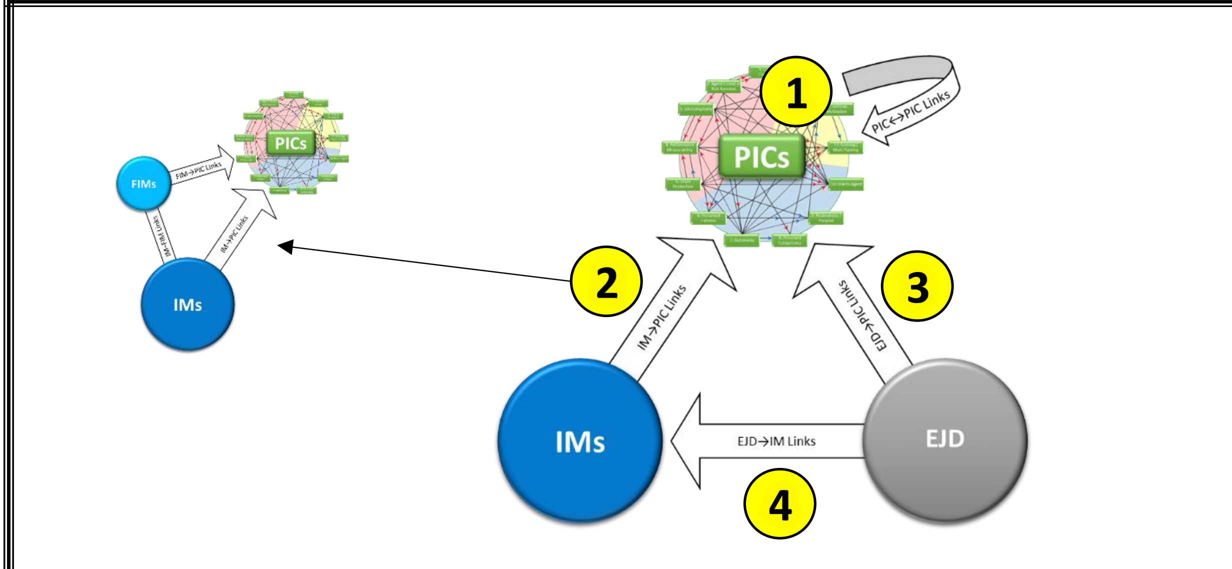
The arrows serve as an indication of the typical direction of the effects between the nodes; more information is supplied with each link model. The designation of the links is designed to be informative at the expense of being lengthy; they indicate which nodes are connected and the typical directionality.

8.3) Section Flow Diagram

This subsection illustrates how this section proceeds.

SECTION C proceeds in 4 steps. The second step has a few substeps that deal with the Features of Incentive Mechanisms (FIMs). An overview and illustration of the flow of SECTION C is provided in Figure 8-2:

An Illustration of How SECTION C Proceeds:



1	Chapter 9 determines **The Relationship between PICs** (PIC↔PIC Links).

2	Chapter 10 determines **The Relationship between PICs and IMs.**
	FIMs are considered as well:
	• Chapter 10.2 to 10.4 provides the links between PICs and FIMs (FIM→PIC Links).
	• Chapter 10.5 to 10.8 provides the links between:
	    • IMs and FIMs (IM–FIM Links).
	    • IMs and PICs (IM→PIC Links).

3	Chapter 11 determines **The Relationship between EJD and PICs** (EJD→PIC Links).
4	Chapter 12 determines **The Relationship between IMs and EJD** (EJD→IM Links).

Figure 8-2: An illustration of how SECTION C proceeds

8.4) Summary

This subsection concludes Chapter 8: Overview of the Link Models.

Six link models, or sets of links, need to be considered:

- 41 PIC↔PIC Links (the links between the PICs themselves)
- 59 IM→PIC Links (the links between the PICs and IMs)
- 42 IM–FIM Links (the links between the IMs and FIMs)
- 23 FIM→PIC Links (the links between the PICs and FIMs)
- 14 EJD→IM Links (the links between the IMs and EJD)
- 26 EJD→PIC Links (the links between the PICs and EJD)

The identification of each of the sets of links, as well as the construction of the associated link models, can be found in the chapters that follow. Figure 8-3 illustrates what the final version of the link models looks like, and references where they can be found:

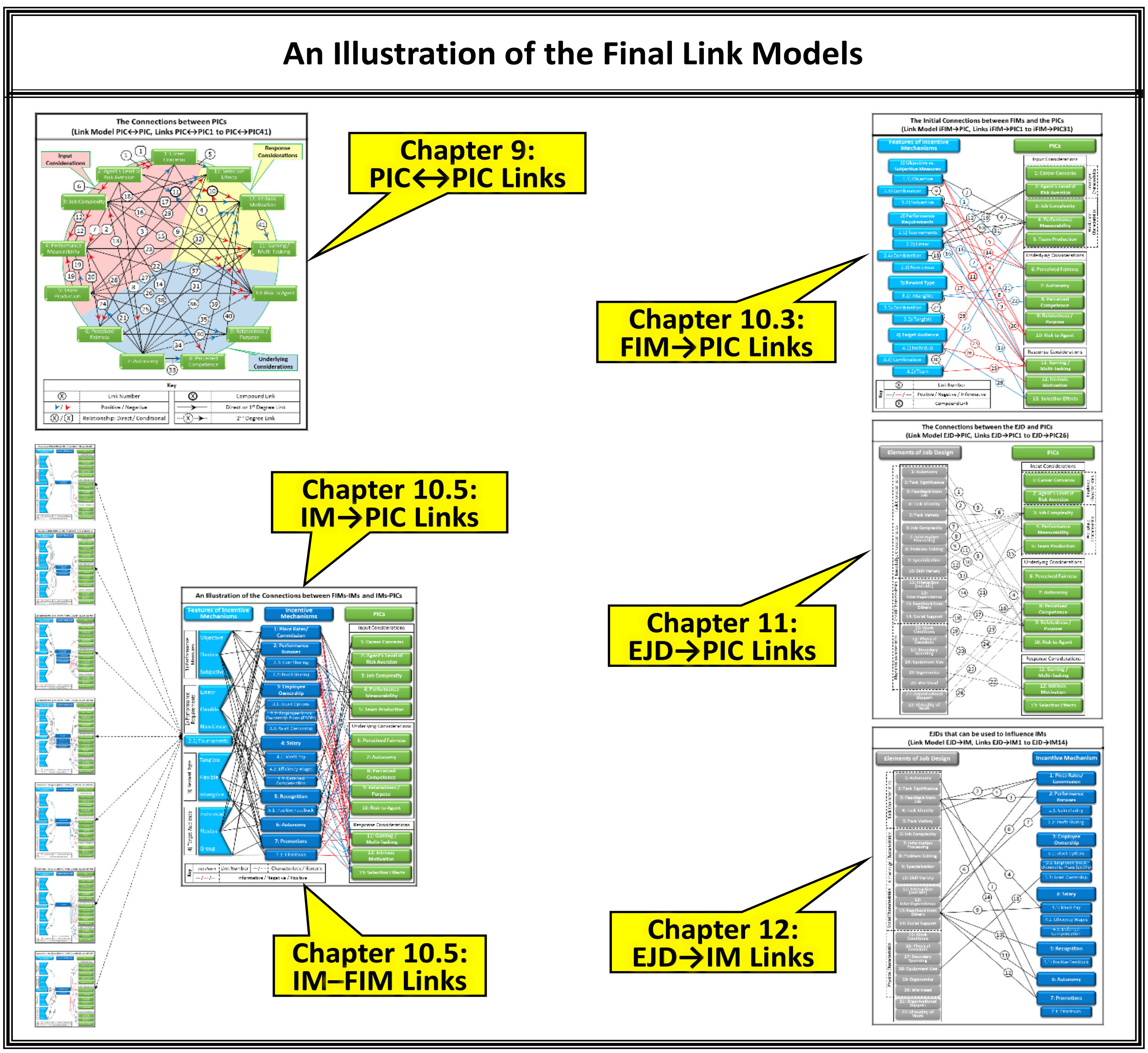


Figure 8-3: An illustration of the final version of the various link models

Chapter 9: The Relationship between PICs

9.1) Introduction

This subsection introduces Chapter 9: The Relationship between PICs.

A specific PIC can be influenced by, and has connections with; other PICs, Incentive Mechanisms (IMs), and Elements of Job Design (EJD). This chapter focuses specifically on the links between the PICs themselves, as indicated by the PIC↔PIC Links in Figure 8-1. Figure 9-1 illustrates how a specific PIC can be influenced, and highlights the type of link that this chapter identifies:

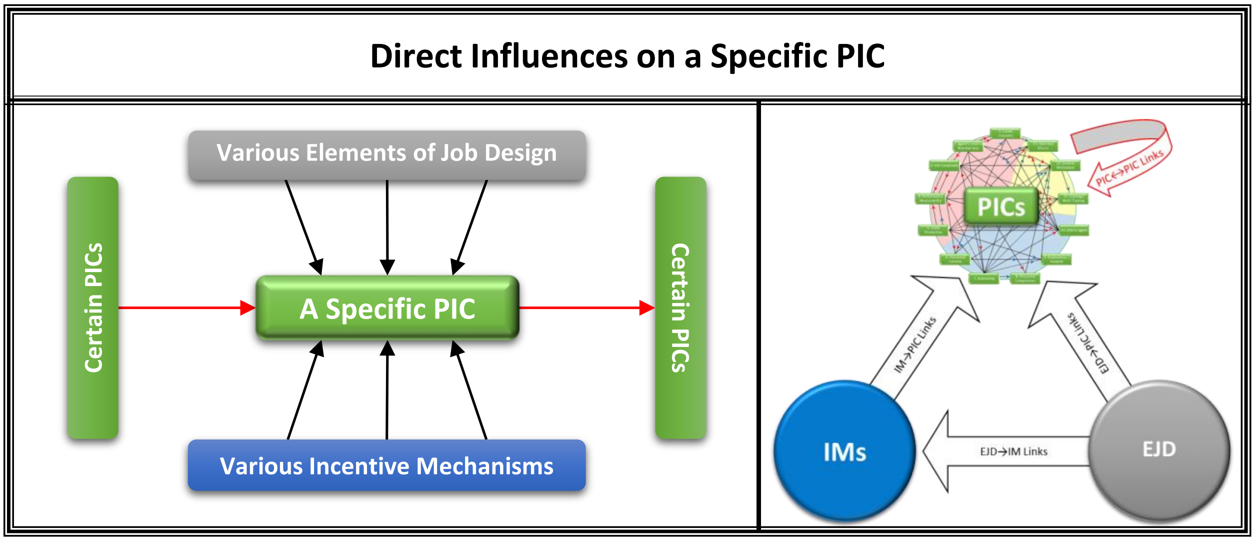


Figure 9-1: The various way a specific PIC can be influenced - this chapter focuses on the links between the PICs themselves

After the links are identified and refined, they are described in sufficient detail, and incorporated into a basic model; Link Model PIC↔PIC. This chapter is structured as follows:

- Chapter 9.1) Introduction
- Chapter 9.2) Links between PICs – Version 1: The Initial Model
    - The links between the PICs are identified and formulated into a basic model.
- Chapter 9.3) Refinement
    - The model and links are refined by addressing the shortcomings identified in the previous subsection.
- Chapter 9.4) Link Model PIC↔PIC (Links between PICs)
    - The final model showing the links between the 13 PICs is provided.
- Chapter 9.5) An Overview of the PIC↔PIC Links (as listed and described in Appendix B.1)
    - An overview of the links between the 13 PICs is provided.
- Chapter 9.6) Summary and Conclusion

9.2) Links between PICs – Version 1: The Initial Model

This subsection identifies the links between the PICs and formulates them into a basic model.

9.2.1) Approach

This subsection identifies the links between the PICs. The links were primarily based on the discussion found in the Key Influential Works (KIWs), yet where necessary, expanded with material from other studies or through simple intuitive observations or inferences. In order to be transparent the sources for the links between PICs are disclosed. All links are classified as:

- KIWs (1).
- Alternative literature (2).
- Inference (3).

The links themselves take on numerous forms, which are indicated to help users process the information easier:

- Positively related or opportunities (P): Improving one PIC generally improves the other.
- Negatively related or threats (N): Improving one PIC is generally at the cost of the other.
- Special considerations (S): A certain condition in relation to one PIC that another PIC should react to in a specific way.

Example: A link between PICs that generally has a negative effect and was identified through simple intuition is thus to be noted as '(N3)'.

When the final model is used to make decisions various considerations may come into play regarding a specific choice. The complexity and variability of situations does not allow the model to provide a formula for a specific choice, congruently the considerations found in the literature do not come with 'weightings'. The user will thus have to weigh the considerations, and use their own judgement to make a decision in relation to a specific situation.

The approach that was hence followed to identify the links is as follows:

1) The KIWs were systematically worked through, links between PICs were noted.
2) The extended description and nature each PIC was considered to identify links with other PICs.
3) Each of the 13 PICs was placed next to the other 12 PICs in an attempt to unearth any noteworthy links that might not have been picked up on before.

9.2.2) Results: The Basic Links and the Initial Model

The investigation identified 44 links between the 13 PICs; the links are designated link iPIC↔PIC1 to link iPIC↔PIC44. These links are illustrated in the basic model in Figure 9-2. Appendix C.1 contains a description of each of the links in this initial list. Note that this initial list of links was scrutinised and refined in the following subsections (the final links, the PIC↔PIC Links, can be found in Chapter 10.5).

Figure 9-2 presents the 13 PICs in a circle so that the links can be drawn between them. The circle highlights three areas which indicate whether the PICs are input, underlying, or response considerations (as described in Chapter 5.5). The links are numbered for ease of reference. The figure is best studied counterclockwise starting from Career Concerns.

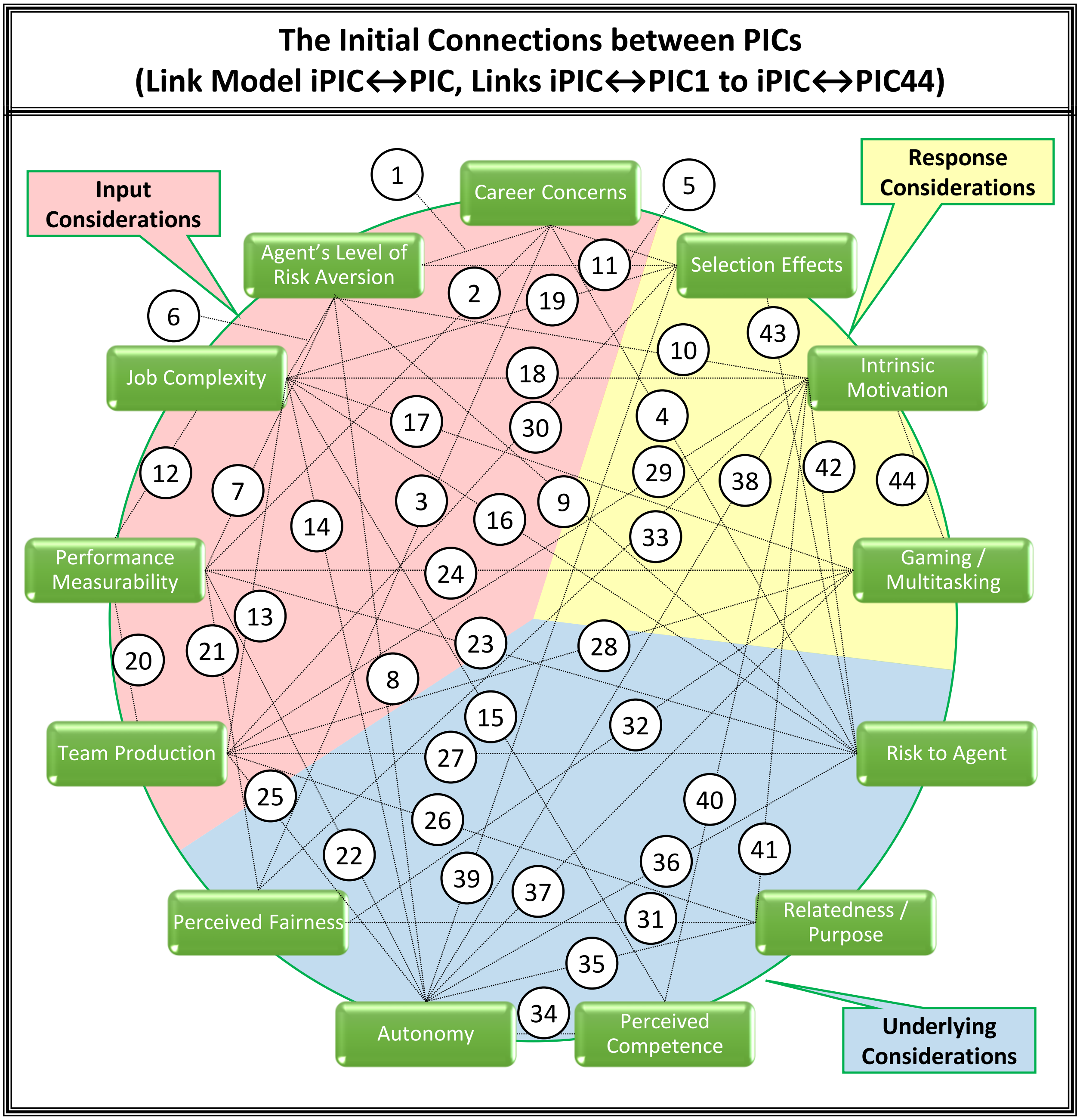


Figure 9-2: The initial model depicting the links or connections between the 13 PICs (links iPIC↔PIC1 to iPIC↔PIC44 can be found in Appendix C.1)

9.2.3) Analysis: What are the Shortcomings of the Initial Model?

The depiction of the links in Figure 9-2, accompanied by a description of each link (Appendix C.1), is not sufficient for inclusion in the final artefact. The links need to be able to inform decisions for each specific PIC as per Figure 9-1. The following shortcomings were addressed:

1) Directionality: The model does not define or illustrate the directionality of the links.
1) Compound Effects: In some cases the effect of one link is magnified by another link. Take link iPIC↔PIC10 and iPIC↔PIC42 for example. Risk to Agent affects Intrinsic Motivation. If the agent is very risk averse the effect of Risk to Agent on Intrinsic Motivation is much greater. Such links are more accurately depicted as acting together.
2) Second-degree links: Some links exist as a combination of two other links. Note link iPIC↔PIC29 for example: Team Production has a positive effect on Intrinsic Motivation, but only because it improves Relatedness/Purpose which improves Intrinsic Motivation as per link iPIC↔PIC26 and link iPIC↔PIC41. Noting what links are second-degree links would give users more insight into the causality of the links.
3) Direct or Conditional links: No distinction is made on the model between link forms. The distinction between 'P' or 'N' links and 'S' links must be depicted.
4) Link Effect: 'S' links have a positive or negative effect which has not been defined. The model can thus not show whether these links are positive or negative.

9.3) Refinement

This subsection refines the basic model and links by addressing the shortcomings identified in the previous subsection.

9.3.1) Approach

In this subsection the initial model is refined by addressing the shortcomings identified in the previous subsection. As the shortcomings were addressed, additional insights into the nuances of the links allowed further refinement. This included redefining, removing, or adding links. A systematic (in the sense that it will follow a series of steps to address the shortcomings) and iterative (in the sense that it will use insight gained to refine previous steps) approach was followed.

The refinement process was approached as follows:

1) The directionality of the links was determined and illustrated on the model.
2) Compound effects were identified and illustrated on the model.
3) Second-degree links were identified and illustrated on the model.
4) A distinction was made on the model between direct and conditional links.
5) Effects (positive or negative) were assigned for each link, refined, and illustrated on the model.

This chapter records and illustrates the steps in their final forms. The iterative nature of the process cannot be recorded for brevity's sake.

9.3.2) Refinement Process Log

The five steps in the refinement process are presented by providing the description, approach, change log, and results for each step.

9.3.2.1) Step 1: Directionality

Description

The first step in the refinement process was to determine the directionality of each link. Directionality refers to the direction of influence between PICs. An example is the link between Autonomy and Intrinsic Motivation (iPIC↔PIC38). Intrinsic Motivation can be improved by increasing Autonomy; Autonomy cannot be improved by improving Intrinsic Motivation. In some cases the directionality of the links between input considerations is not clear. Consider the link between Job Complexity and Agent's Level of Risk Aversion (iPIC↔PIC6) for example. A high level of risk aversion is best coupled with less uncertainty, and thus less Job Complexity; yet the one does not influence the state of the other. Making a job less complex will not lower an Agent's Level of Risk Aversion. It does however suggest a configuration. Directionality is provided for all links to enable the construction of further models. It is determined as accurately as possible with the unclear links between input considerations; some ambiguity in this instance is not a concern as users will not only look at what influences the input considerations, but also at what is influenced by the input considerations. This phenomena is also addressed in Step 4.

Providing the directionality of links improves the final model by helping users to understand causes and effects.

Approach

The directionality was determined by systematically working through the links as depicted in Figure 9-2 and described in links iPIC↔PIC1 to iPIC↔PIC44 (recorded in Appendix C.1). During this process certain refinements were made to these links. This is recorded in the change log.

Change Log

1a) Link iPIC↔PIC13 is a combination of link iPIC↔PIC12 and iPIC↔PIC20. Link iPIC↔PIC13 is thus removed and the description of iPIC↔PIC12 is extended.

1b) Removed link iPIC↔PIC15b; it is the same as link iPIC↔PIC18.

1c) Removed link iPIC↔PIC20c; it is a link between Incentive Mechanisms and PICs (an IM→PIC Link).

1d) Removed link iPIC↔PIC23b; it is incorporated into link iPIC↔PIC23a, hence only link iPIC↔PIC23 remains.

Results

This process resulted in the removal and alteration of a few links as recorded in the change log. The result of this process is depicted in the final model in the manner illustrated in Figure 9-3:

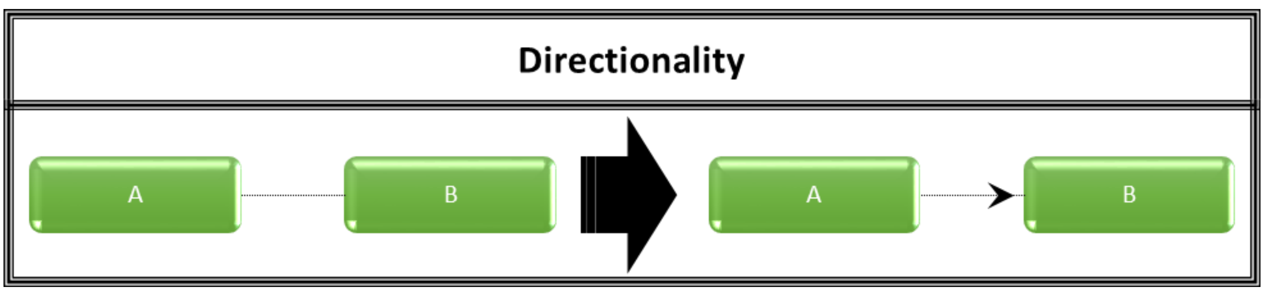


Figure 9-3: An illustration of how directionality is depicted in the final model

9.3.2.2) Step 2: Compound Links

Description

The second step in the refinement process was to identify compound links. Compound links refer to links where the effect of one link is magnified by another link. These links need to be regarded in conjunction with each other for a specific PIC. An example is the link between Agent's Level of Risk Aversion and Intrinsic Motivation (iPIC↔PIC10), and between Risk to Agent and Intrinsic Motivation (iPIC↔PIC42). If the agent is very risk averse the effect of Risk to Agent on Intrinsic Motivation is much greater.

Identifying compound links improves the final model by helping users to understand how certain links work in conjunction with one another.

Approach

Compound links were identified by systematically looking at the links that affect each PIC, and determining whether significant compound effects exist between any of them. The links depicted in Figure 9-2 and described in links iPIC↔PIC1 to iPIC↔PIC44 (recorded in Appendix C.1) were used. Two compound links were identified and altered as recorded in the change log:

Change Log

2a) Link iPIC↔PIC42 and iPIC↔PIC10 are combined into link iPIC↔PIC45:

A44) Agent's Level of Risk Aversion + Risk to Agent → Intrinsic Motivation

- **Risk to Agent is expected to decrease Intrinsic Motivation, the decrease of Intrinsic Motivation will be higher for more risk averse employees.**
  - [N1] **Risk to Agent is expected to decrease Intrinsic Motivation**: Risk inherently conduce toward an external perceived locus of causality or an external locus of control; the individual is not (or more precisely, does not perceive himself/herself to be) in control of factors that affect him/her. This leads to diminished Intrinsic Motivation: "research revealed that… diminish intrinsic motivation because… they conduce toward an external perceived locus of causality" (Ryan & Deci, 2000b, p. 70).
  - [S3] **The effects of Risk to Agent will increase as an Agent's Level of Risk Aversion increases**. Agent's Level of Risk Aversion determines how reluctant an employee is to accept risk.

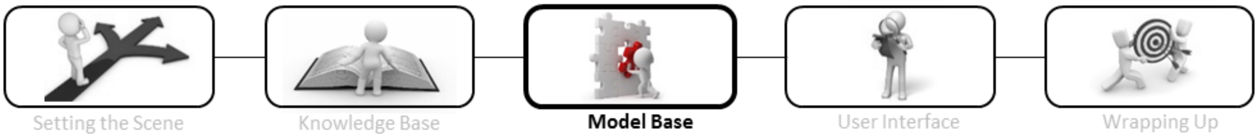
2b) Link iPIC↔PIC11 and iPIC↔PIC43 are combined into link iPIC↔PIC46:

A45) Agent's Level of Risk Aversion + Risk to Agent → Selection Effects

- **Increasing the risk to employees will intensify the Selection Effects, this risk related Selection Effects will be larger for more risk averse employees.**
  - [P2] **Increasing the risk to employees will intensify the Selection Effects**: "The particular institutional details of incentive schemes will attract different kinds of workers and generate sorting, thereby affecting the composition of the workforce" (Boudreau & Lakhani, 2011, p. 2). This holds with risks especially.
  - [S2] **Agent's Level of Risk Aversion will intensify the effect of risk related Selection Effects**: Noting that performance pay introduces uncertainties hence risk, "more risk averse individuals seem to apply for jobs where performance contingent wages are less likely" (Grund & Sliwka, 2010, p. 10).

Results

This process resulted in two compound links being added to the model. Both of these compound links were cases where Agent's Level of Risk Aversion and Risk to Agent affect the same PIC. This seems reasonable as the cost of imposing risk on an agent will vary according to how risk averse an employee is. The result of this process is depicted in the final model in the manner illustrated in Figure 9-4:



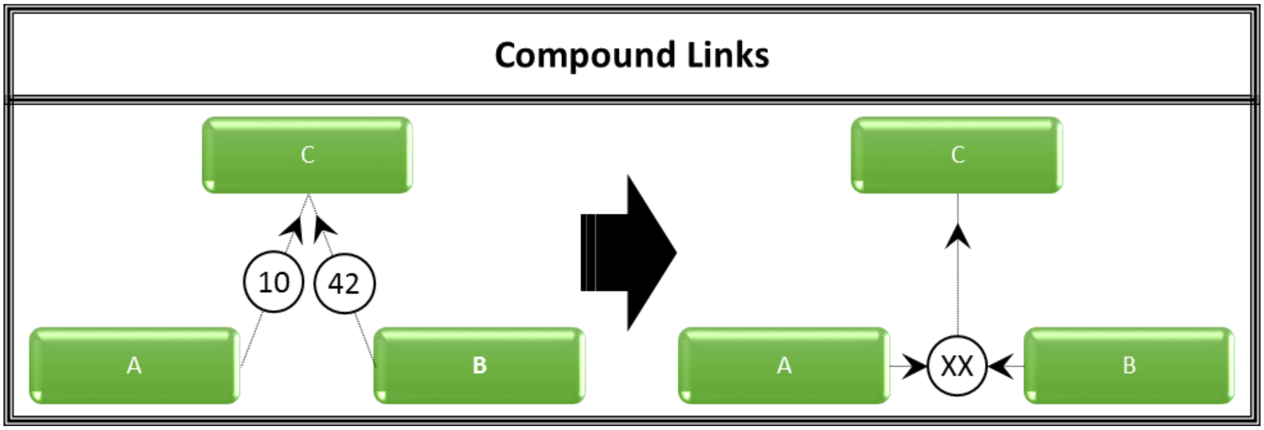


Figure 9-4: An illustration of how compound links are depicted in the final model

9.3.2.3) Step 3: 2nd-degree Links

Description

The third step in the refinement process was to identify 2^{nd}-degree links. These refer to links that are a consequence of two other links. An example is the link between Team Production and Intrinsic Motivation (iPIC↔PIC29). Team Production has a positive influence on Intrinsic Motivation, yet this is due to Team Production having a positive influence on Relatedness/Purpose (iPIC↔PIC26) which in turn has a positive influence on Intrinsic Motivation (iPIC↔PIC41).

Highlighting 2^{nd}-degree links improves the final model by helping users to note causality whilst being aware of noteworthy indirect links.

Approach

2^{nd}-degree links were identified by systematically examining links between PICs that are linked to a specific PIC. The links depicted in Figure 9-2 and described in links iPIC↔PIC1 to iPIC↔PIC44 (recorded in Appendix C.1) were used. Six links were changed to 2^{nd}-degree links as recorded in the change log:

Change Log

The links that changed to 2^{nd}-degree links are as follows:

- 3a) Link iPIC↔PIC17 changed to a 2^{nd}-degree link (iPIC↔PIC12 + iPIC↔PIC24).
- 3b) Link iPIC↔PIC28 changed to a 2^{nd}-degree link (iPIC↔PIC20 + iPIC↔PIC24).
- 3c) Link iPIC↔PIC29 changed to a 2^{nd}-degree link (iPIC↔PIC26 + iPIC↔PIC40).
- 3d) Link iPIC↔PIC35 changed to a 2^{nd}-degree link (iPIC↔PIC25 + iPIC↔PIC26).
- 3e) Link iPIC↔PIC36 changed to a 2^{nd}-degree link (iPIC↔PIC22 + iPIC↔PIC23 & iPIC↔PIC14 + iPIC↔PIC16).
- 3f) Link iPIC↔PIC37 changed to a 2^{nd}-degree link (iPIC↔PIC22 + iPIC↔PIC24).

Results

This process resulted in six links being changed to 2nd-degree links. The distinction allows a user to consider the noteworthy links, but brings the causality to the user's attention. The result of this process is depicted in the final model in the manner illustrated in Figure 9-5:

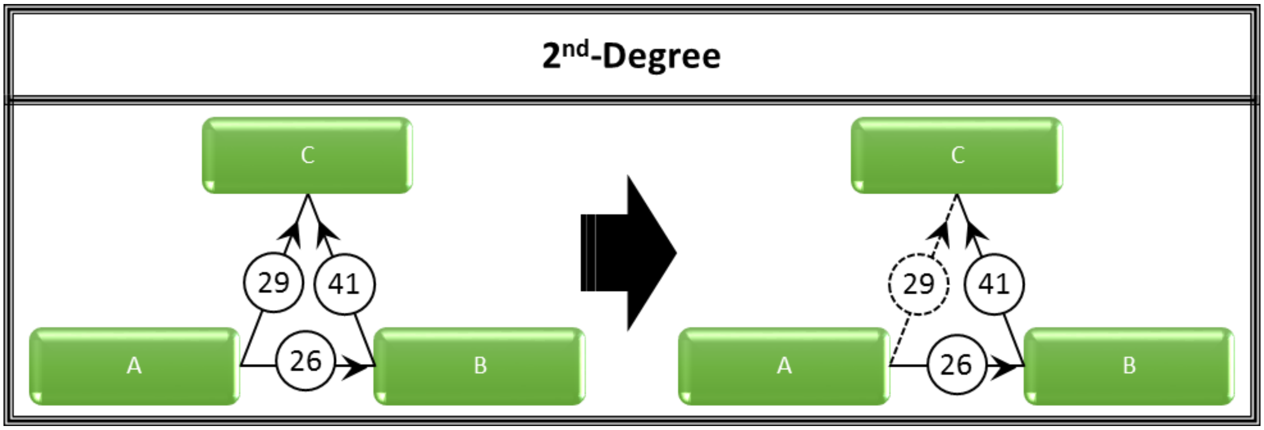


Figure 9-5: An illustration of how 2nd-degree links are depicted in the final model

Note that various indirect links can be found; Career Concerns can have an influence on Autonomy which has an influence on Relatedness/Purpose, Perceived Competence has an effect on Intrinsic Motivation which has an effect on Gaming/Multitasking. The 2nd-degree links do not endeavour to cover all indirect links; only influences deemed appropriately noteworthy are recorded to make the model as usable as possible. Users can trace back to indirect links by using the model should they have a need to do so.

9.3.2.4) Step 4: Link Relationship – Distinction and Depiction of Direct and Conditional Links

Description

The fourth step in the refinement process makes a distinction between directly related and conditionally related links. The initial model did not depict link forms. Link forms 'P' or 'N' are substantially different from link form 'S' as defined in Chapter 9.2.1. As the next subsection discusses, links labelled 'S' can either be labelled 'P' or 'N'. Links labelled 'P' or 'N' will henceforth be labelled 'R' while links labelled 'S' will be labelled 'C' as described here:

- Link Relationship:
  - Directly Related (R): The PICs are related in the sense that altering one of them generally alters the other.
  - Conditionally Related (C): Only under certain conditions or circumstances does the link become relevant. The link is not exclusively relational but can be informative.
- Link Effect:
  - Positively related or opportunities (P): Improving one PIC generally improves the other.
  - Negatively related or threats (N): Improving one PIC is generally at the cost of the other.

Example; a link that has a positive influence only under certain conditions sourced from Key Influential Works will thus be noted as [PC1].

Distinguishing between direct and conditional links improves the final model by helping users to understand when a link is generic, and when it is dependent on some condition. This is especially useful when considering 2nd-degree links, indirect links, and such cascading effects.

Approach

'P' and 'N' links are classed as 'R' links while 'S' links are classed as 'C' links; this is also illustrated in the final model. At this stage a better understanding of the nuances of the links calls for a revision of the designation of these link forms. This was done by systematically reviewing each of the links. Alterations and new designations are recorded in the change log.

Change Log

4a) Link iPIC↔PIC2 "Career Concerns & Performance Measurability" changed from P1 to S1, hence PC1: The link is based on visibility which is related to but not the same as Performance Measurability.

4b) Link iPIC↔PIC6 "Agent's Level of Risk Aversion & Job Complexity" changed from N1 to S1 hence NC1. The two are not related, changing the one does not change the other. Rather a certain effect is observed if a specific condition is found in the first and a specific condition is found in the second.

4c) Link iPIC↔PIC35 "Autonomy & Relatedness/Purpose" changed from P3 to S3, hence PC3. It is dependent on some level of Task Interdependence.

4d) Link iPIC↔PIC45's second item is changed from S3 to N3, hence NR3.

4e) Link iPIC↔PIC46's second item is changed from S2 to P3, hence PR2.

Results

Five changes were made. The result of these changes is depicted in the final model in the manner illustrated in Figure 9-6:

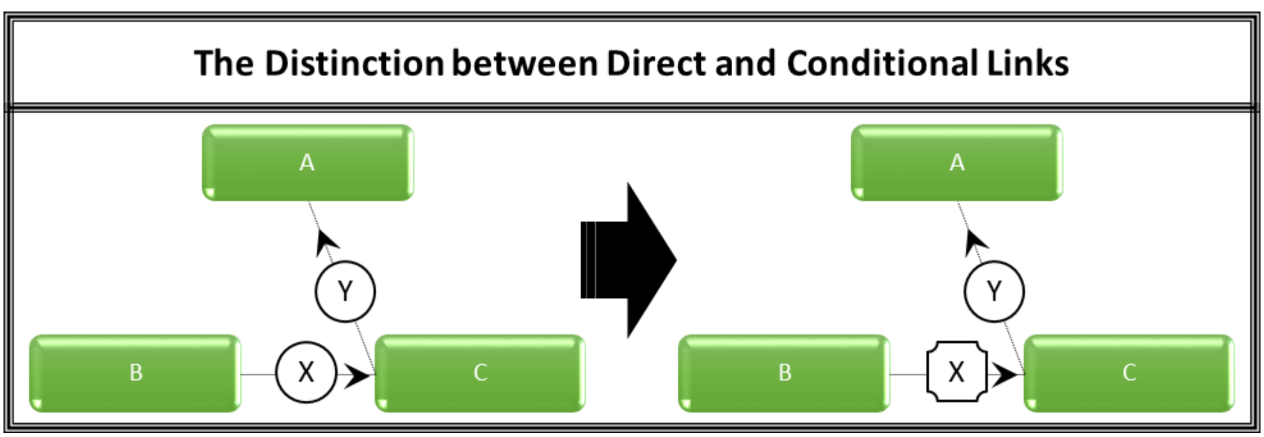


Figure 9-6: An illustration of how link relationships (direct or conditional) are depicted in the final model

9.3.2.5) Step 5: Link Effect - Identification and Illustration of Positive and Negative Links

Description

The fifth step in the refinement process was to identify and illustrate whether links are positive or negative. Positive links refers to situations where improving one PIC generally improves the other; negative links refers to situations where improving one PIC is generally at the cost of the other.

Distinguishing between positive and negative links improves the final model by helpings users to anticipate the effects of links.

Approach

1) Existing effect designations for link labelled ‘R’ (Previously ‘P’ or ‘N’) were reviewed by systematically considering each of the links.
2) When links labelled ‘C’ (Previously ‘S’) were examined it became apparent they also result in PICs being either ‘positively related or opportunities’ or ‘negatively related or threats’. These links were systematically reviewed and designated ‘N’ or ‘P’.

Change Log

5a) Link iPIC↔PIC1b is designated N.
5b) Link iPIC↔PIC2 is designated P.
5c) Link iPIC↔PIC6 is designated N.
5d) Link iPIC↔PIC7 is designated N.
5e) Link iPIC↔PIC8 is designated N.
5f) Link iPIC↔PIC12b is designated N.
5g) Link iPIC↔PIC15 is designated N.
5h) Link iPIC↔PIC18 is designated P.
5i) Link iPIC↔PIC20a is designated P.
5j) Link iPIC↔PIC20b is designated N.
5k) Link iPIC↔PIC21 is designated N.
5l) Link iPIC↔PIC25 is designated P.
5m) Link iPIC↔PIC32 is designated N.
5n) Link iPIC↔PIC35 is designated P.
5o) Link iPIC↔PIC39 is designated P.

Results

14 links labelled ‘C’ (previously designated ‘S’) were changed to the new format and designated ‘P’ or ‘N’. The result of these changes is depicted in the final model in the manner illustrated in Figure 9-7:

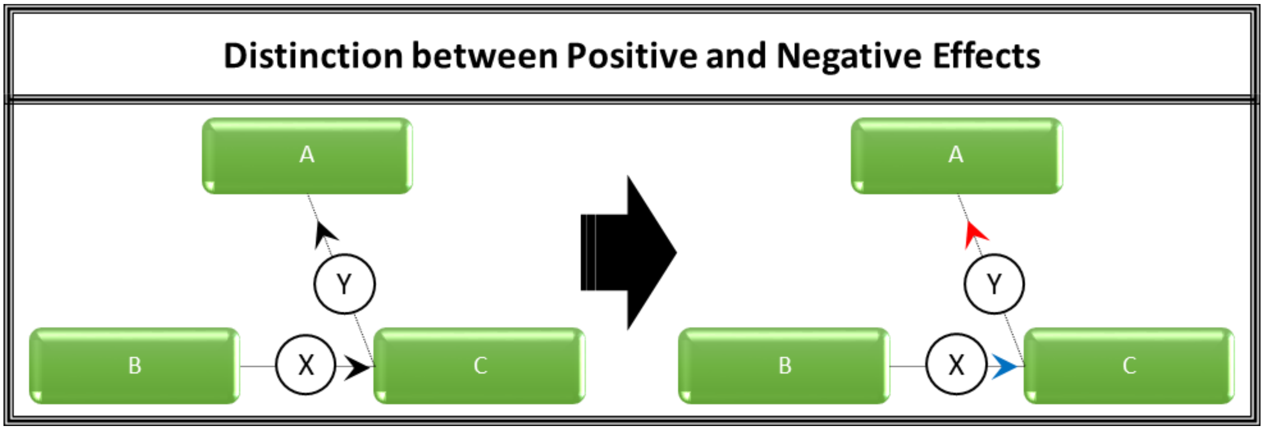


Figure 9-7: An illustration of how link effects (positive or negative) are depicted in the final model

9.3.3) Overview of Changes

The previous subsection results in various changes to the list of links and the initial model. This subsection provides an overview of the changes that led to the refined model.

9.3.3.1) Differences between Initial Links (iPIC↔PIC Links) and Refined Links (PIC↔PIC Links)

The initial links, labelled iPIC↔PIC1 to iPIC↔PIC44, undergo various changes during the refinement process. This subsection summarises and illustrates these changes and assigns a new numbering system that corresponds with the refined model. The refined list of links, PIC↔PIC1 to PIC↔PIC41, can be found in Appendix B.1. Figure 9-8 illustrates the refinements that were made to the initial links; it makes reference to the change logs in the previous subsection.

9.3.3.2) Model Development: From the Initial Model (Link Model iPIC↔PIC) to the Refined Model (Link Model PIC↔PIC)

The refinements to the links were incorporated into the visual model during the refinement process. The model now incorporates and illustrates:

1) the directionality of the links.
2) compound links.
3) a distinction between direct and 2^{nd}-degree links.
4) a distinction between directly related and conditionally related links.
5) a distinction between positive and negative links.

This is illustrated in Figure 9-9. The illustration depicts a snapshot of the visual model after each of the five steps in the refinement process. Note that while the refinement process was iterative, Figure 9-9 only depicts the final result of each stage for brevity's sake.

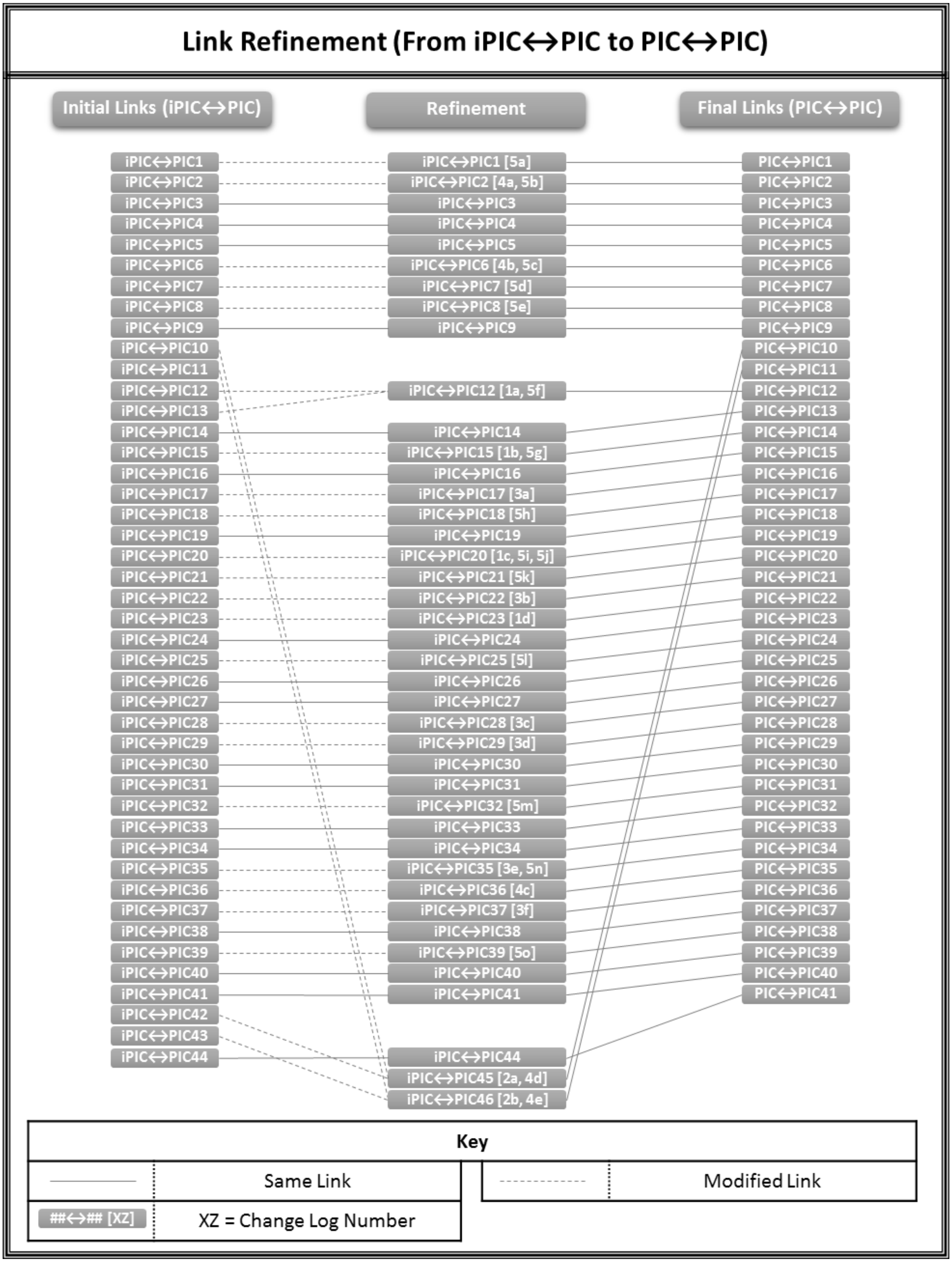
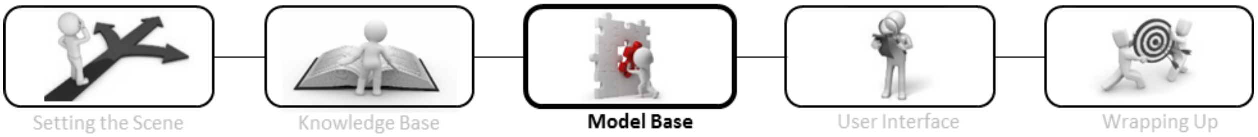


Figure 9-8: An illustrative overview of the changes between the initial and final list of links



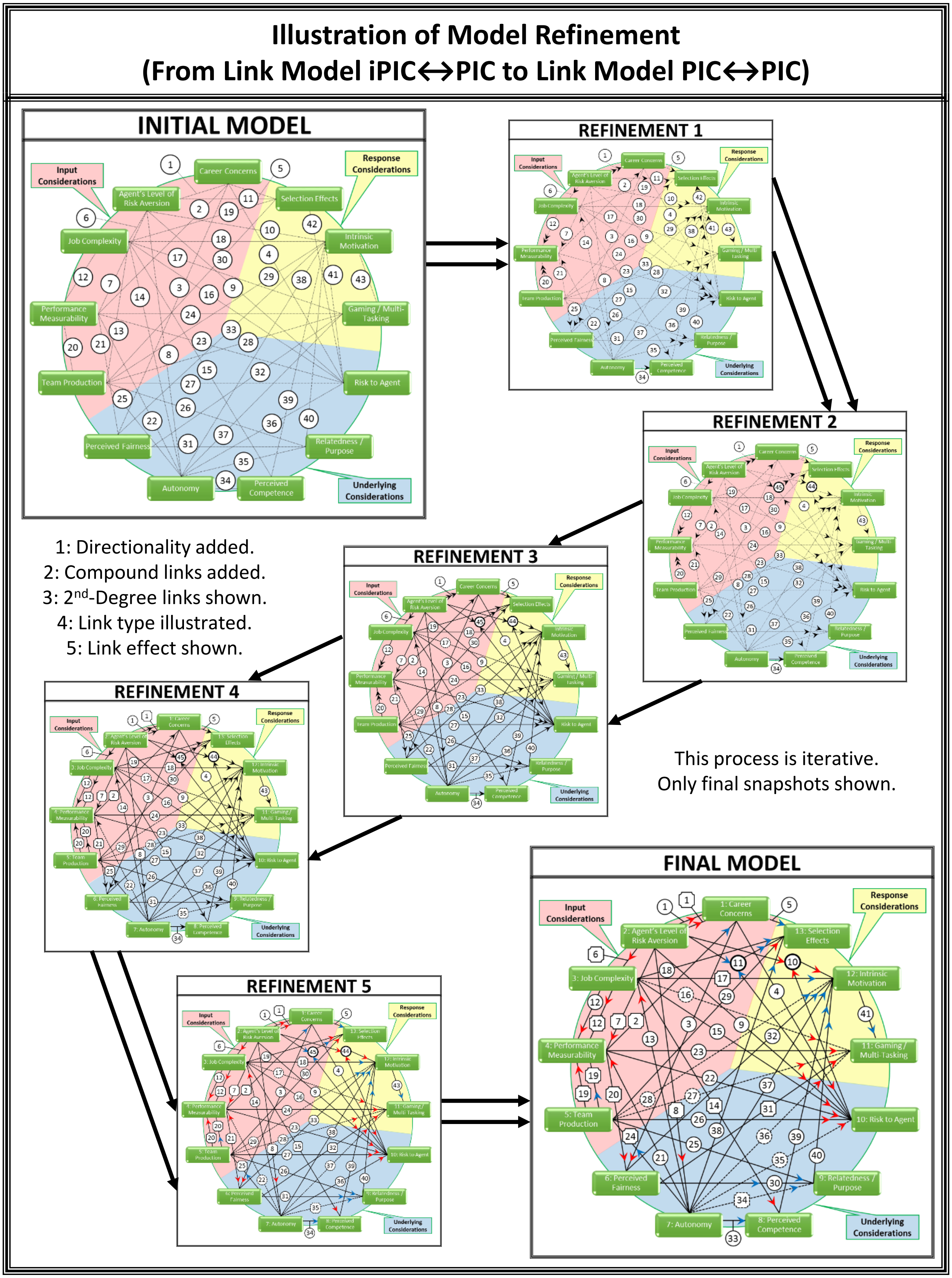


Figure 9-9: An illustration of model refinement

9.4) Link Model PIC↔PIC (Links between PICs)

This subsection provides the final model showing the links between the 13 PICs.

This subsection contains the final results of the refinement process. The final visual model (Link Model PIC↔PIC) is complemented by a table that shows the links in text or coded form (see Appendix D.1), and followed by an overview of the PIC↔PIC Links. A description of each PIC↔PIC Link can be found in Appendix B.1.

This final model contains 41 links between the 13 PICs. Each link is categorised in various ways:

- Type of Link – The manner in which the PICs are linked together.
    - [D] Direct or 1st-degree: Where one PIC directly affects another.
    - [S] 2nd-degree: Where one PIC has an effect on another due to its effect on a PIC affecting that PIC.
    - [C] Compound: Where two links magnify each other's effects on a certain PIC.
- Link Relationship – The type of relationship between two PICs.
    - [R] Directly Related: The PICs are related in the sense that altering one of them generally alters the other.
    - [C] Conditionally Related: Only under certain conditions or circumstances does the link become relevant. The link is not exclusively relational but can be informative.
- Link Effect – The effect of the link on the PIC it points towards.
    - [P] Positively Related or Opportunities: Improving one PIC generally improves the other.
    - [N] Negatively Related or Threats: Improving one PIC is generally at the cost of the other.
- Source Type – The type of source that the link was derived from.
    - [1] Key Influential Works.
    - [2] Alternative Literature.
    - [3] Inference.

The 41 links between the 13 PICs, designated link PIC↔PIC1 to link PIC↔PIC41 with a descriptive list in Appendix B.1, are illustrated in Figure 9-10. The best way to use Figure 9-10 would be to focus on a specific PIC, and then study the links to that PIC. When used in this manner the model communicates:

1) which PICs affect the PIC in question (links pointing towards).
2) which PICs are affected by the PIC in question (links pointing away).
3) whether these links hold generically (changing one PIC generally changes the other), or are conditional (link number in circle or square).
4) whether the effects are typically positive/opportunities or negative/threats (blue arrow or red arrow).
5) whether the link is direct or the result of other connections/2nd-degree links (solid or dotted line).

Once the relevant links have been identified in Figure 9-10, the description of the links and their effects can be found in the list of links PIC↔PIC1 to PIC↔PIC41 (Appendix B.1).

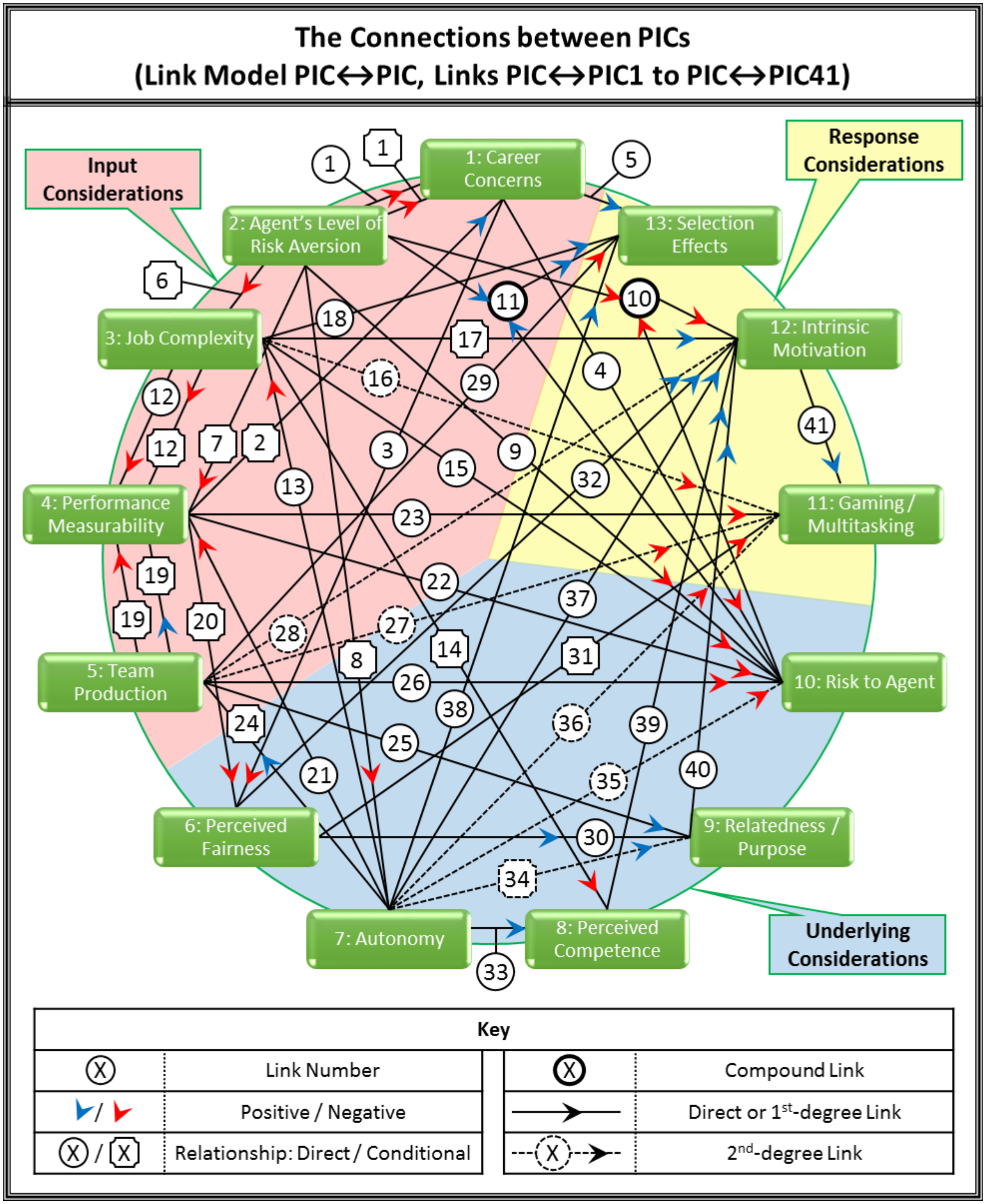


Figure 9-10: The final model (Link Model PIC↔PIC) depicting the links or connections between the 13 PICs

The visual model is complemented by Table D-1 in Appendix D.1, which show the links in text or coded form.

9.5) An Overview of the PIC↔PIC Links (As Listed and Described in Appendix B.1)

This subsection contains an overview of the links between the 13 PICs.

Figure 9-10 shows the visual representation of Link Model PIC↔PIC, the links between the PICs. It includes a designation for each link. This designation can be used to refer to the descriptive list of links in Appendix B.1. The format of the list is as follows:

[Link number] <u>[Names of PICs that are linked]</u>
[(Link Effect)(Link Relationship)(Source Type)] **Summary of the link's effect**: Justification and explanation.

Key:

- Link Effect – The effect of the link on the PIC it points towards.
    - [P] Positively Related or Opportunities: Improving one PIC generally improves the other.
    - [N] Negatively Related or Threats: Improving one PIC is generally at the cost of the other.
- Link Relationship – The type of relationship between two PICs.
    - [R] Directly Related: The PICs are related in the sense that altering one of them generally alters the other.
    - [C] Conditionally Related: Only under certain conditions or circumstances does the link become relevant. The link is not exclusively relational but can be informative.
- Source Type – The type of source that the link was derived from.
    - [1] Key Influential Works.
    - [2] Alternative Literature.
    - [3] Inference.

The information behind the 41 links, link PIC↔PIC1 to link PIC↔PIC41, is condensed into approximately 3 500 words as recorded in Appendix B.1. Link PIC↔PIC36 is included below as an example of a PIC↔PIC Link:

PIC↔PIC36) <u>Autonomy & Gaming/Multitasking</u>
[NR2] [2nd-degree link: PIC↔PIC21 and PIC↔PIC23] **Increasing Autonomy increases the scope for Gaming/Multitasking**: As Autonomy increases the following situation is approached; "In organisations with a high ambiguity and a low routine, measurement of output is more difficult" (Dooren, 2005, p. 372). As measurability declines the scope for Gaming/Multitasking increases. This has led to the observation; "Whether workers make effective use of Autonomy may depend on individual motivational states" (Heidemeier & Wiese, 2014, p. 18).

9.6) Summary and Conclusion

This subsection concludes Chapter 9: The Relationship between PICs.

A total of 41 primary links or connections were identified between the 13 PICs. These links are designated link PIC↔PIC1 to link PIC↔PIC41, and referred to as the PIC↔PIC Links. The PIC↔PIC Links are illustrated in Figure 9-10, and each link is described in Appendix B.1. The PIC↔PIC Links can be used to understand how the PICs affect one another.

When the sources of the information behind the links were considered it was found that:

- 19 links were identified from the Key Influential Works.
- 13 links were sourced from other studies.
- 13 links were drawn through simple intuitive observations and inferences.

While a constructivist approach guides model building, Link Model PIC↔PIC is well grounded in the literature. Inferences are noted and can be scrutinised, but are necessary to build a model that is rounded enough to be of use in practice.

It is interesting to note that there are links to all PICs. This supports the findings in the structured literature review, and is in line with the systems approach. One can also note that the links are generally away from the input considerations, and generally toward the response considerations (with underlying considerations mixed). This suggests that the categories are meaningful.

While 41 links are highlighted, it can be deduced that there are links between all PICs; some of these links are more noteworthy, and some are less noteworthy. This chapter followed a process to identify and describe certain links to help users to make better decisions. If the structured literature review is repeated at some time in the future, and some PICs are added or removed, the process followed in this chapter can be repeated to update Link Model PIC↔PIC and the PIC↔PIC Links to reflect the amended or evolving Knowledge Base.

Chapter 10: The Relationship between PICs and IMs (Including FIMs)

10.1) Introduction

This subsection introduces Chapter 10: The Relationship between PICs and Incentive Mechanisms.

A specific PIC can be influenced by, and has connections with; other PICs, Incentive Mechanisms (IMs), and Elements of Job Design (EJD). This chapter focuses specifically on the links between the PICs and IMs as indicated by the IM→PIC Links in Figure 8-1. Figure 10-1 illustrates how a specific PIC can be influenced, and highlights the type of link that this chapter identifies:

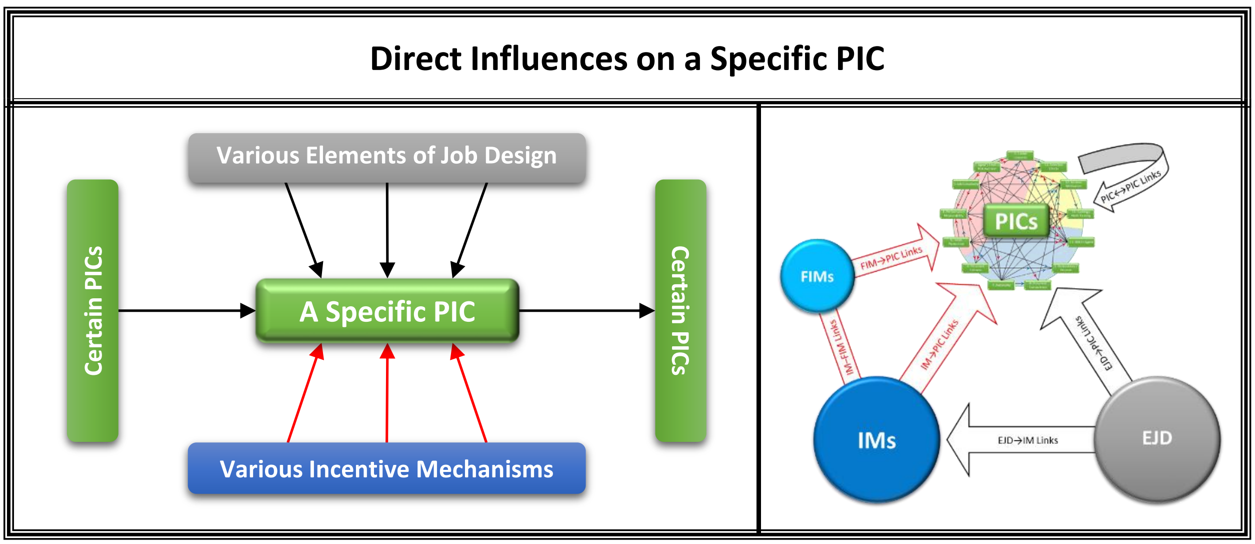
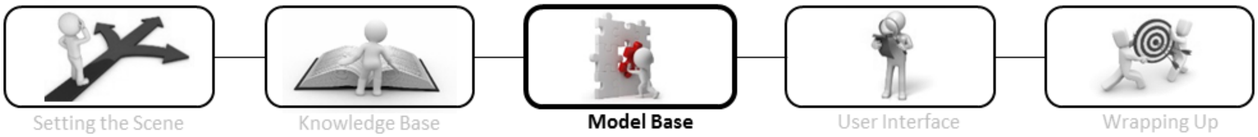


Figure 10-1: The various ways a specific PIC can be influenced

Note that the relationship between IMs and PICs is described by not only the IM→PIC Links, but the IM–FIM Links and FIM→PIC Links as well (see Chapter 6.5 and the illustration in Figure 8-1):

- IM→PIC Links are the links between the PICs and IMs.
- IM–FIM Links are the links between the IMs and Features of Incentive Mechanisms (FIMs).
- FIM→PIC Links are the links between the PICs and FIMs.



After the IM→PIC/IM–FIM/FIM→PIC Links were identified and refined, they were described in sufficient detail, and incorporated into basic models; Link Model IM→PIC, Link Model IM–FIM, and Link Model FIM→PIC (Link Model IM→PIC and IM–FIM are combined). This chapter is structured as follows:

- Chapter 10.1) Introduction
- Chapter 10.2) Determining the Connections between PICs and FIMs
  - The process used to determine the links between PICs and FIMs is documented.
- Chapter 10.3) Link Model FIM→PIC (links between PICs and FIMs)
  - The final model showing the links between the 13 PICs and the FIMs is provided.
- Chapter 10.4) An Overview of the FIM→PIC Links (as listed and described in Appendix B.2)
  - An overview of the links between the 13 PICs and the FIMs is provided.
- Chapter 10.5) Determining the Connections between PICs and IMs + IMs and FIMs
  - The process used to determine the links between PICs and IMs, and between FIMs and IMs, is documented.
- Chapter 10.6) Link Model IM→PIC + IM–FIM (links between PICs and FIMs + IMs and FIMs)
  - The models showing the links between the 13 PICs and the IMs, and between FIMs and IMs, is provided.
- Chapter 10.7) An Overview of the IM→PIC Links (as listed and described in Appendix B.3)
  - An overview of the links between the 13 PICs and the IMs is provided.
- Chapter 10.8) An Overview of the IM–FIM Links (as listed and described in Appendix B.4)
  - An overview of the links between the FIMs and the IMs is provided.
- Chapter 10.9) Summary and Conclusion

10.2) Determining the Connections between PICs and FIMs

This subsection documents the process used to determine the links between PICs and FIMs.

10.2.1) Overview and Approach

While seven types of Incentive Mechanisms (IMs) were identified, with a number of subcategories, each IM has to approach certain features in a specific way. The four Features of Incentive Mechanisms (FIMs) that need to be addressed are (See Chapter 6.5 and Appendix A.3):

- FIM1) Performance measures; objective or subjective.
- FIM2) Performance requirements; relative/tournaments, and linear or non-linear (Piece Rates, percentages, quotas, thresholds).
- FIM3) Reward Types; tangible or intangible.
- FIM4) Target Audience; individual or team-based.

Separating the FIMs from the IMs allows the links between the features for each IM and the PICs to be drawn only once. This reduces the amount of information DSS users have to contend with.

This subsection draws the links between the 13 PICs and the four FIMs. Note that 2nd-degree links were not incorporated into this model as the overload of information would reduce the usability of the model. If required, 2nd-degree links can be found by considering the FIM→PIC Links in Appendix B.2 in conjunction with the PIC↔PIC Links in Appendix B.1.

The links between the PICs and FIMs were categorised in the following ways:

- Link Effect – The FIMs and PICs do not all affect each other in the same manner. Relationships are:
  - Positive (P) – Common opportunities or positive effects in relation to the linked PIC.
  - Negative (N) – Common dangers, threats, or negative effects in relation to the linked PIC.
  - Informative (I) – A situation where FIMs are typically used in a certain manner.
- Compound Effects – Compound links refer to links where the effect of one link is magnified by another link. These links need to be regarded in conjunction with each other for a specific PIC. Compound links are denoted by a '+' after the 'P' or 'N' in the list of connections.

The steps that were taken to identify the links were as follows:

1) The information for each FIM, as recorded in Appendix A.3, was considered in relation to the PICs.
2) Discussions of each FIM in Key Influential Works and Influential Works were considered for any additional links.
3) Each FIM was considered in relation to each PIC in an attempt to unearth any noteworthy links that might not have been picked up on before.

10.2.2) Results – Version 1: The Initial Links and FIMs Model

The investigation identified 31 links between the FIMs and the 13 PICs; the links are designated link iFIM→PIC1 to link iFIM→PIC31. These links are illustrated in Figure 10-2. Appendix C.2 contains a description of each of the links in this initial list. This initial list of links was scrutinised and refined in the following subsections.

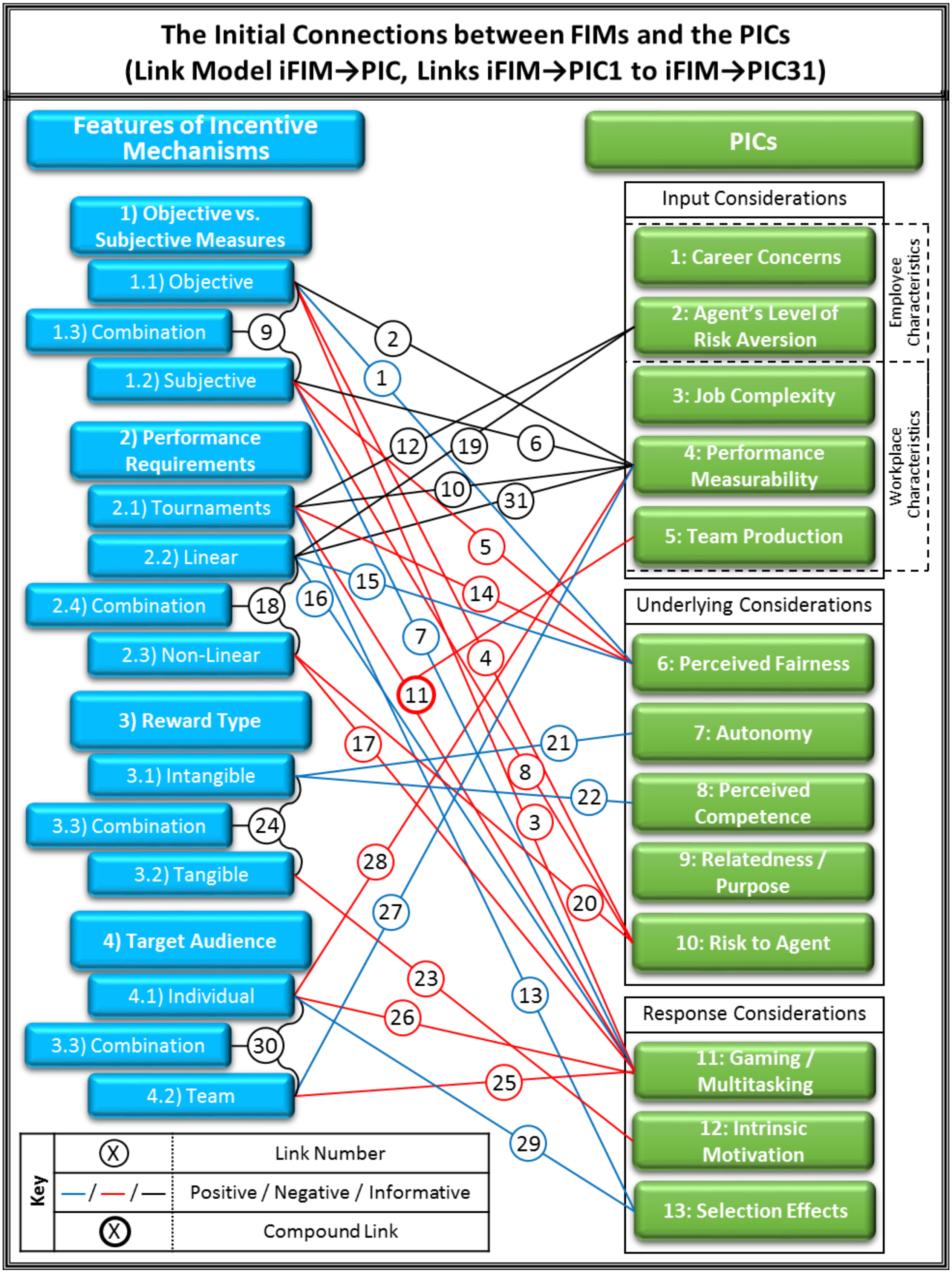


Figure 10-2: The initial model depicting the links or connections between the FIMs and the PICs

10.2.3) Analysis: What are the Shortcomings of the Initial Model?

It was expected that it would be difficult to integrate the model depicted in Figure 10-2, accompanied by a description of each link (Appendix C.2), into the DSS. The FIMs were to support the IMs by illuminating the typical pros and cons of the approach followed by each category. The current list did not provide users with a clear guideline between the trade-offs between each of the options in the four categories. With the exception of Tournaments, each category depicted a decision between two opposites: Objective vs. Subjective, Linear vs. Non-linear, Tangible vs. Intangible, and Individual vs. Group. The information contained in the 31 links above could be conveyed in a more comprehendible fashion by focusing on the four categories as opposed to trying to provide information for 13 specific instances as done in Figure 10-2. In practice solutions are expected to be a combination of the two opposites in each category.

10.2.4) Refinement – From iFIM→PIC Links to FIM→PIC Links

In this subsection the model was refined to highlight the trade-offs when a combination of the options was used as opposed to simply providing information for each of the options individually. The refinement was done by remodelling each of the FIMs as a sliding scale, or combination of two opposites, rather than an item with individual options. This was done by converting and combining the links in the initial model. The initial links iFIM→PIC1 to iFIM→PIC31 were thus reconfigured into links FIM→PIC1 to FIM→PIC23, and the visual model was reproduced to reflect this. The changes that were made to the initial model are as follows:

1) Each FIM is modelled as a combination of, instead of as a choice between, individual elements. This is illustrated in Figure 10-3:

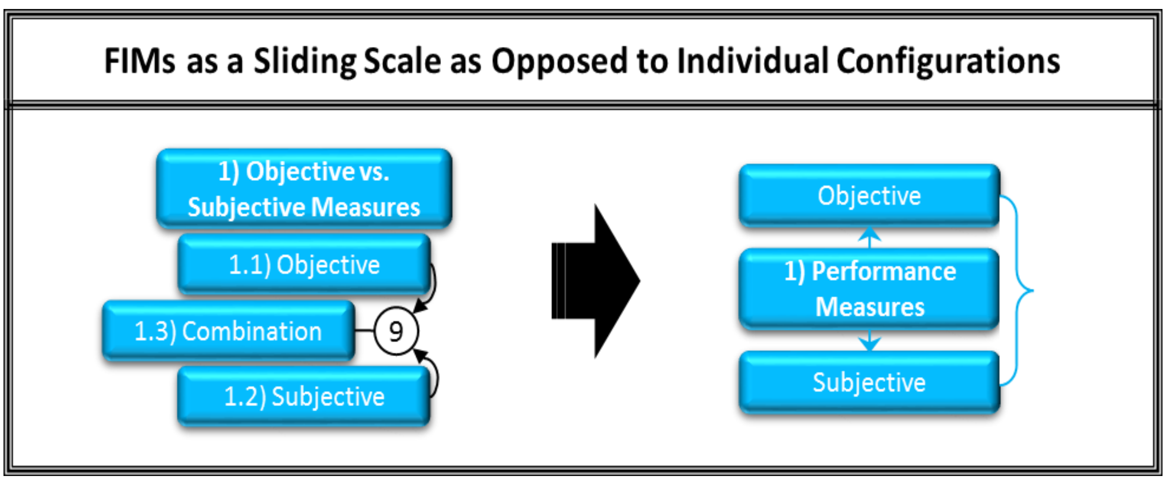
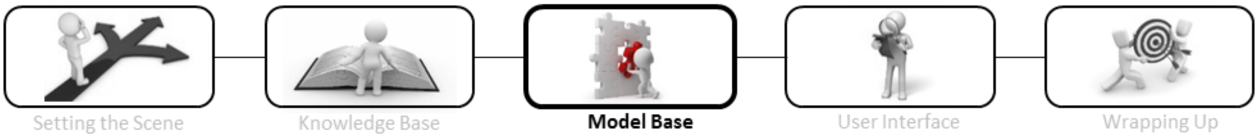


Figure 10-3: FIMs as a sliding scale as opposed to individual configurations

2) Instead of a link being Positive (P) or Negative (N), links can now be Governing (G).
   - Link Effect: Governing (G) – Certain, often opposing, effects that occur to a certain degree depending on the combination or position on the sliding scale as illustrated in Figure 10-3. These effects can be a combination of; positive effects, negative effects, and certain threats or opportunities (indicated by green arrows).
3) Link iFIM→PIC1 and iFIM→PIC5 were combined into link FIM→PIC2.

4) Link iFIM→PIC2 and iFIM→PIC6 were combined into link FIM→PIC1.
5) Link iFIM→PIC3 and iFIM→PIC7 were combined into link FIM→PIC4.
6) Link iFIM→PIC4 and iFIM→PIC8 were combined into link FIM→PIC3.
7) Link iFIM→PIC9 is removed, the information can be found in the description of Incentive Mechanisms.
8) Link iFIM→PIC10 was labelled FIM→PIC10.
9) Link iFIM→PIC11 was labelled FIM→PIC11.
10) Link iFIM→PIC12 was labelled FIM→PIC12.
11) Link iFIM→PIC13 was labelled FIM→PIC13.
12) Link iFIM→PIC14 was labelled FIM→PIC14.
13) Link iFIM→PIC15 was extended and labelled FIM→PIC6.
14) Link iFIM→PIC16 and iFIM→PIC17 were combined into link FIM→PIC5.
15) Link iFIM→PIC18 was removed, the information can be found in the description of Incentive Mechanisms.
16) Link iFIM→PIC19 was removed, it is a second-degree link recorded in link PIC↔PIC9.
17) Link iFIM→PIC20 was modified and labelled FIM→PIC7.
18) Link iFIM→PIC21 was extended and labelled FIM→PIC15.
19) Link iFIM→PIC22 was extended and labelled FIM→PIC16.
20) Link iFIM→PIC23 was labelled FIM→PIC17.
21) Link iFIM→PIC24 was removed, the information can be found in the description of Incentive Mechanisms.
22) Link iFIM→PIC25 and link iFIM→PIC26 were combined into link FIM→PIC20.
23) Link iFIM→PIC27 and link iFIM→PIC28 were combined into link FIM→PIC21.
24) Link iFIM→PIC29 was extended and labelled FIM→PIC22.
25) Link iFIM→PIC30 was removed, the information can be found in the description of Incentive Mechanisms.
26) Link iFIM→PIC31 was modified and labelled FIM→PIC8.
27) Link FIM→PIC18 was added.
28) Link FIM→PIC19 was added.
29) Link FIM→PIC23 was added.
30) Link FIM→PIC9 was added.

While the number of links was reduced from 31 to 23 no information was omitted and four new links were identified. Duplication was reduced and the readability of the model improved significantly as illustrated in Figure 10-4. The improvements were not simply visual but extended to the descriptions in links FIM→PIC1 to FIM→PIC23 (Appendix B.2) as opposed to those of links iFIM→PIC1 to iFIM→PIC31 (Appendix C.2).



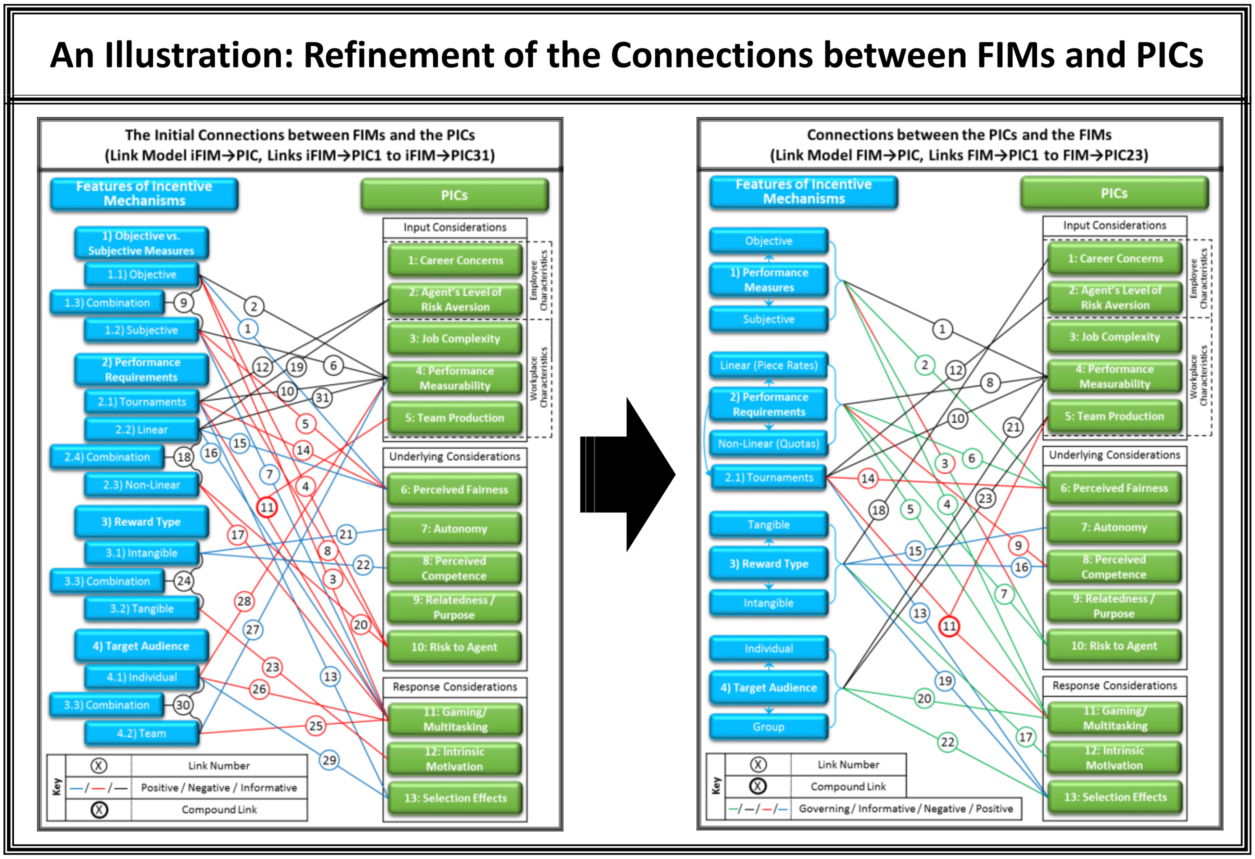


Figure 10-4: An illustration of the refinement of the model depicting the connections between PICs and FIMs

10.3) Link Model FIM→PIC (Links between PICs and FIMs)

This subsection provides the final model showing the links between the 13 PICs and the FIMs.

The links between the PICs and the Features of Incentive Mechanisms (FIMs), designated link FIM→PIC1 to link FIM→PIC23 (described in the next subsection and listed in Appendix B.2), are illustrated in Figure 10-5. Note that only first-degree links are shown; showing second-degree links resulted in a cluttered illustration similar to that depicted in Figure 10-6. The 2nd-degree links can be found by considering the FIM→PIC Links in Appendix B.2 in conjunction with the PIC↔PIC Links in Appendix B.1. The information in Figure 10-5 can also be found on Table D-2.

Link Model FIM→PIC (Figure 10-5) can be used to quickly determine how the FIMs typically influence a specific PIC. Distinctions were made between effects that were typically positive or negative, and instances where the effect could be either positive or negative depending on the configuration of the specific FIM. Figure 10-5 is best used in conjunction with Figure 10-7 through Figure 10-13.

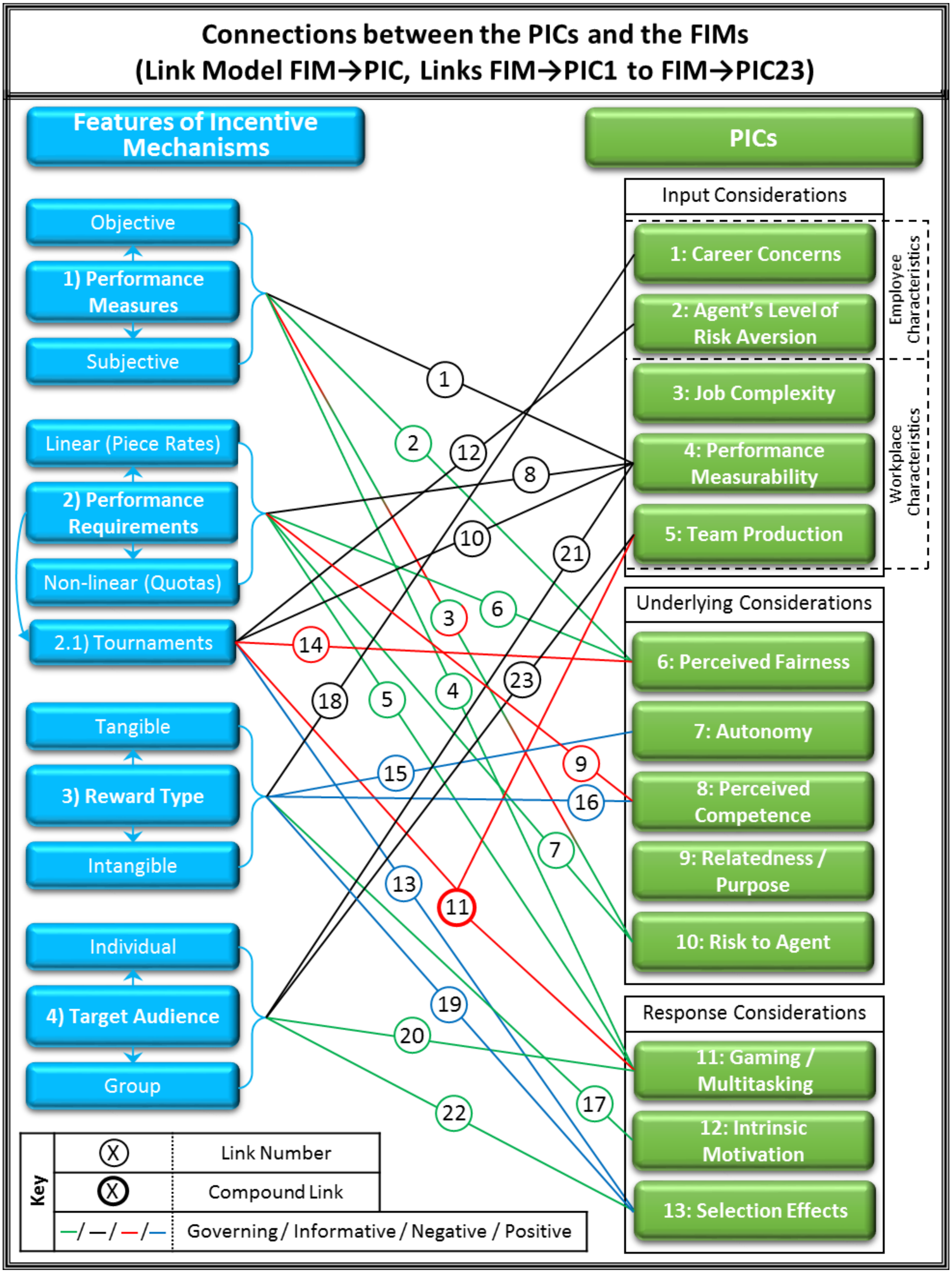


Figure 10-5: The refined model depicting the links or connections between PICs and FIMs

10.4) An Overview of the FIM→PIC Links (As Listed and Described in Appendix B.2)

This subsection contains an overview of the links between the 13 PICs and the FIMs.

Figure 10-5 shows the visual representation of Link Model FIM→PIC, the links between the PICs and the Features of Incentive Mechanisms (FIMs). It includes a designation for each link. This designation can be used to refer to the descriptive list of links in Appendix B.2. The format of the list is as follows:

[Link number)] [<u>Name of FIM & PIC that is linked]</u>
[Link Effect] **[Summary of the link's effect**: Additional Information.]

Key:

- Link Effect - The FIMs and PICs do not all affect each other in the same manner. The relationships are:
    - [P] Positive – Common opportunities or positive effects in relation to the liked PIC.
    - [N] Negative – Common dangers, threats, or negative effects in related to the linked PIC.
    - [I] Informative – A situation where FIMs are typically used in a certain manner.
    - [G] Governing – Certain, often opposing, effects that occur to a certain degree depending on how much emphasis is placed on each option in a specific FIM. These effects can be a combination of; positive effects, negative effects, and certain threats or opportunities.

The information behind the 23 links, link FIM→PIC1 to link FIM→PIC23, is condensed into approximately 2 000 words as recorded in Appendix B.2. Link FIM→PIC8 and link FIM→PIC9 are included below as examples of the FIM→PIC Links:

FIM→PIC8) <u>Performance Requirements (FIM2) & Performance Measurability (PIC4)</u>
[I] **Linear schemes, especially Piece Rates, work best in simple jobs:** Piece Rates work best in situations where "workers carry out simple jobs, in the sense that aggregate measures of performance are available" (Prendergast, 1999, p. 17).

FIM→PIC9) <u>Performance Requirements (FIM2) & Perceived Competence (PIC8)</u>
[N] **Performance requirements can harm Perceived Competence through competency signals:** Performance requirements such as quotas, milestones, and thresholds must be designed with competency signals in mind; performance-based incentives serve as competency feedback. If these performance requirements are not well designed they will either not stimulate improved levels of performance, or be difficult to achieve. If they are unreasonable, employees will seldom achieve them and experience a negative competency signal. Sending Positive Feedback can lift an employee's level of Perceived Competence (Aparicio, Vela, Sanchez, & Montes, 2012; Eisenberger & Rhoades, 1999) and vice versa.

10.5) Determining the Connections between PICs and IMs + IMs and FIMs

This subsection documents the process used to determine the links between PICs and IMs, and between FIMs and IMs.

This subsection identifies the noteworthy connections between each specific Incentive Mechanism (IM) and the 13 PICs whilst describing each IM's Features of Incentive Mechanisms (FIMs). In order to understand the relationship between IMs and PICs the links below have to be considered in conjunction with the links between IMs and FIMs.

10.5.1) Approach

In order to link each specific IM with its FIMs and the 13 PICs the information on the 13 PICs (Appendix A.1) and IMs (Appendix A.2) was consulted. This was done through a cyclic process, repeated seven times (once for each IM and its subsections), guided by the following steps:

1) The links between the IM and its FIMs were drawn.
2) Cases where the IM's subcategories are different from the main IM were identified and described.
3) The links between the IM and its FIMs were finalised with a sanity check.
4) The links between the IM and the 13 PICs were drawn, using the information on the 13 PICs (Appendix A.1) and IMs (Appendix A.2).
5) Cases where the IM's subcategories were different to the main IM were identified and described.
6) Necessary inferences were made to draw links not covered by the documents in step 4, this included adding a generic link reflecting each governing link where an IM has a specific configuration in regards to the FIM.
7) The links between the IM and the 13 PICs were finalised with a sanity check.
8) The links between FIMs and the IM, and between the IM and the 13 PICs, were illustrated on a figure.
9) The process was repeated seven times, once for each type of IM.
10) Various checks were done to ensure consistency, iterations continued until scrutinising the model revealed no further shortcomings.

The IM→PIC Links and IM–FIM Links do not include 2nd-degree links as found in the PIC↔PIC Links, yet some generic links are included. Note the following:

- Classic 2nd-degree links (an IM affecting a PIC because of its effect on a PIC connected to that PIC); these links are not incorporated into this model as it would result into too much information to be processed by a user. The information that would drive such 2nd-degree links would only repeat the links in Link Model PIC↔PIC.
- Generic links (a link between an IM and PIC that is generically covered by considering the IM→PIC Links and the IM–FIM Links as depicted in Figure 8-1); these links are partially included as the links between IMs and PICs are to be emphasised to improve the model's clarity and usability. Users will note the IMs-PICs Links more easily than considering the IM–FIM Links in conjunction with the FIM→PIC Links and isolating the information for a specific configuration.

The links between the IMs and PICs are categorised in the following ways:

- Link Effect – The IMs and PICs do not all affect each other in the same manner. The relationships are:
    - Positive (P) – The use of this IM typically has a positive effect on the linked PIC.
    - Negative (N) – The use of this IM typically has a negative effect on the linked PIC.
    - Informative (I) – A situation where an IM is typically used in a certain manner.
- Link Type – Some links are specific to a certain IM, while other links are worth noting yet generic:
    - Characteristic link (C) – A link between an IM and PIC that characteristically has a certain effect. This is usually specific to the IM.
    - Generic link (G) – A link between an IM and PIC, informed by the links between IMs-FIMs-PICs, due to the configuration of a specific FIM as per the governing FIM→PIC Links.

Note that where an IM has subsections, the links of the IM automatically apply, unless another link is specifically drawn from the subcategory.

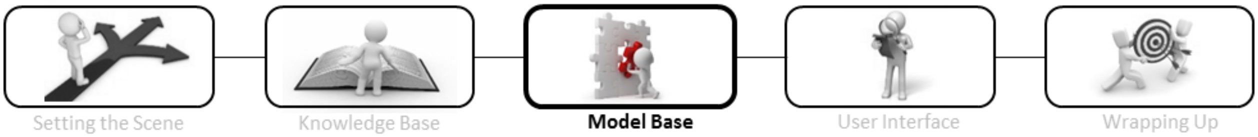
10.5.2) An Overview of the Results

This subsection contains the links between FIMs and IMs, and the links between IMs and PICs. A total of 42 IM–FIM Links and 59 IM→PIC Links were identified. As illustrated in Figure 10-6 below, this results in an extensive amount of information that is difficult to communicate clearly. The links are thus shown separately for each of the types of Incentive Mechanisms. This results in a usable set of figures that users would be able to understand and utilise. The results are written up as follows:

1) A graphical illustration of all the links (documented in this subsection).
2) A table summarising the information on the right-hand side of the illustration in conjunction with the links between PICs and FIMs (documented in Appendix D.2).
3) Usable figures showing the links for each type of IM separately (documented in Chapter 10.6).
4) The list with the description of the links between IMs and PICs, labelled 'IM→PIC Links' (documented in Appendix B.3 with an overview in Chapter 10.7).
5) The list with the description of the links between FIMs and IMs, labelled 'IM–FIM Links' (documented in Appendix B.4 with an overview in Chapter 10.8).

Figure 10-6 is an illustration of all the links between FIMs and IMs, and between IMs and PICs. It is not usable, but an illustrative overview of the number of links that have to be incorporated into the model. It is thus complemented by Table D-2 in Appendix D.2. Table D-2 contains a summary of the information on the right hand side of Figure 10-6. This is shown in conjunction with the links between PICs and FIMs as shown in Figure 10-5. Combining this data allows a user to easily ascertain what considerations are related to a specific PIC.

Notice that certain PICs do not have many links in Figure 10-6; Career Concerns, Agent's Level of Risk Aversion, Job Complexity, Autonomy, and Relatedness/Purpose. This is not to say that the PICs cannot be influenced by the IMs, or do not have any bearing on what IMs are used. Take Job Complexity for example; Job Complexity has a huge influence on the use of Piece Rates/Commission, yet there is no link between them. This is due to the fact that it is strictly not the complexity of the job that affects the use of Piece Rates, but the difficulty of measuring the performance of the job due to its complexity. What we have here is a second-degree link; Job Complexity is linked with Performance Measurability (link PIC↔PIC12) and Performance Measurability is linked to Piece Rates/Commission (link IM→PIC1). There are many second-degree links that are not included in the IM→PIC Links, including them in the IM→PIC Links would increase the number of links in that series from 59 to many times this number. A lot of material would also be duplicated. When a specific issue, the use of an IM or trouble with a PIC, is focused on, designers would naturally consider the second-degree links as well. This is facilitated in the DSS through the UI.



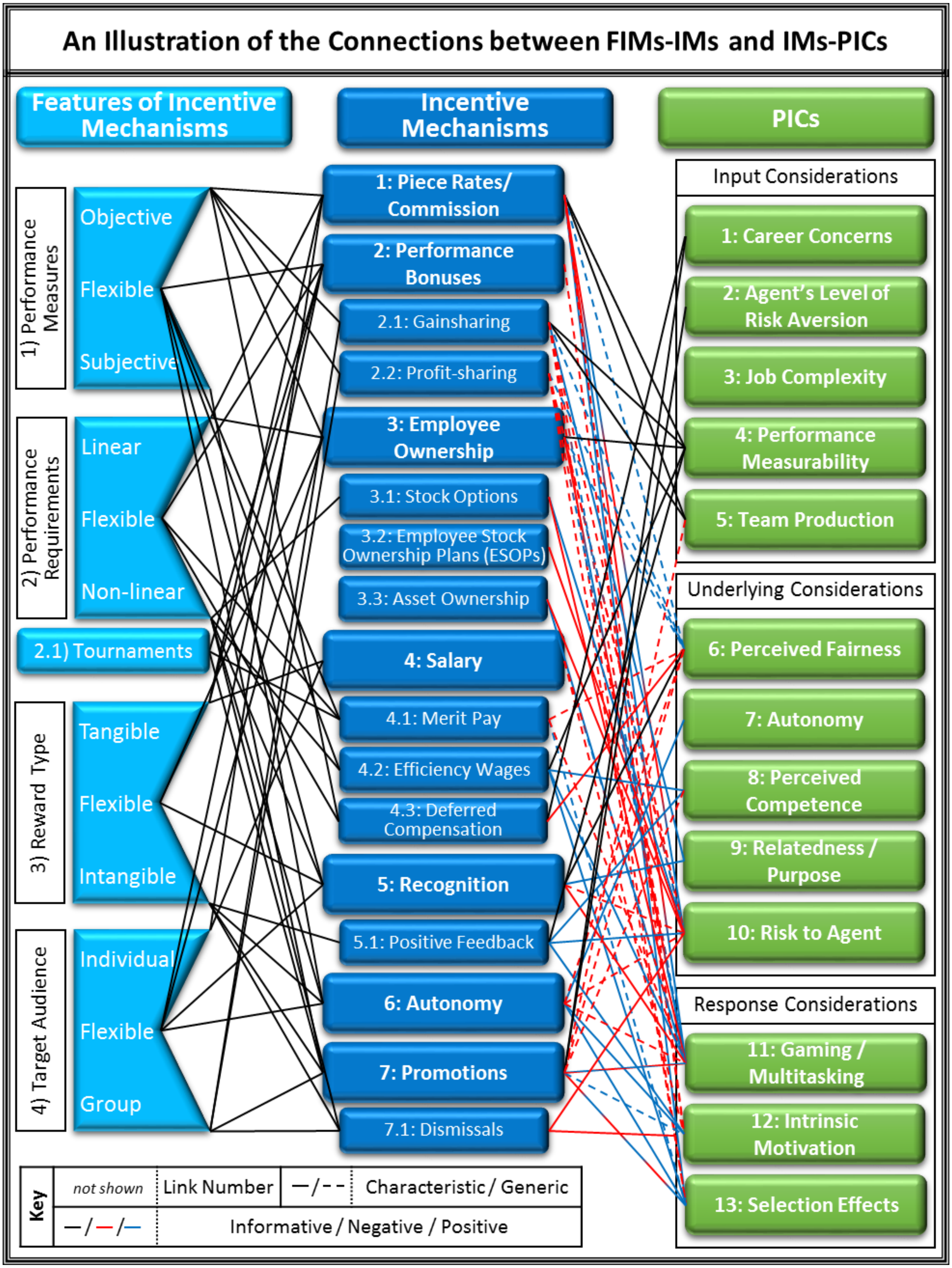


Figure 10-6: An illustration of the connections between FIMs-IMs, and IMs-PICs

10.6) Link Model IM→PIC + IM–FIM (Links between PICs and FIMs + IMs and FIMs)

This subsection provides the models showing the links between the 13 PICs and the IMs, and between FIMs and IMs.

This subsection contains seven figures showing the links between Features of Incentive Mechanisms (FIMs) and Incentive Mechanisms (IMs), and between IMs and PICs, for each type of Incentive Mechanism. Link Model IM→PIC and Link Model IM–FIM is thus represented by:

- Figure 10-7 – Piece Rates/Commission
- Figure 10-8 – Performance Bonuses
- Figure 10-9 – Employee Ownership
- Figure 10-10 – Salary
- Figure 10-11 – Recognition
- Figure 10-12 – Autonomy
- Figure 10-13 – Promotions

Separating the jumble of information as seen in Figure 10-6 into separate figures renders the information in a much more usable state. The figures below clearly show which PICs are affected by a specific Incentive Mechanism; this is useful when a certain Incentive Mechanism is to be scrutinised or improved. Alternatively Table D-2 can be used to quickly see all the Incentive Mechanisms that affect a specific PIC; this is useful when a certain PIC is to be scrutinised or improved. The information behind each link can be found in the IM→PIC Links (Appendix B.3) and IM–FIM Links (Appendix B.4).

Each figure shows:

- how the IM is connected to the FIMs;
- which PICs the IM is connected to;
- the 'type' of the link between the IM and PIC;
- the 'effect' of the link between the IM and PIC.

Figure 10-12, Autonomy, includes an additional type of link. Autonomy as IM naturally has an effect on Autonomy as PIC. By virtue of this it affects various PICs as per links PIC↔PIC8, 13, 21, 24, 33, 34, 36, 37, and 38. Including these links in Figure 10-12 and in the IM→PIC Links would be a duplication, yet it is helpful to make the links immediately clear when Figure 10-12 is consulted. The shadow links, as shown in Figure 10-12, serve as a practical intermediate; unnecessary duplication is avoided with the IM→PIC Links, but attention is drawn to the links on the figure. The challenge with the numerous series of links and such a substantial amount of information, is to present or communicate it in as usable, effective, and concise a manner as possible. Hence the nuanced approach with Figure 10-12.

Note that various IMs have subcategories. In these cases the links between the parent element and the PICs hold for the subcategories and the PICs as well, unless the subcategory has a specific link that overrides the parent link.

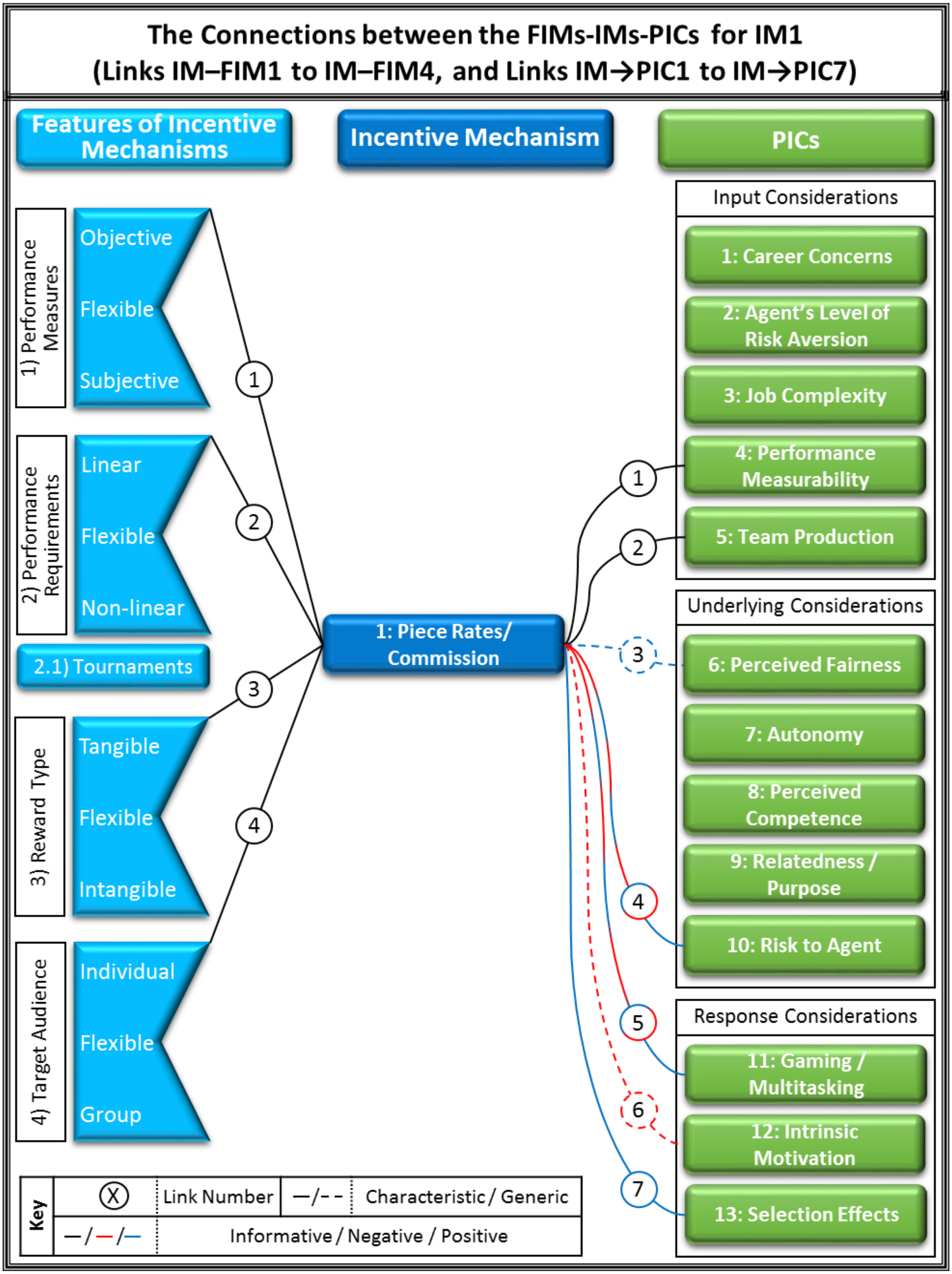


Figure 10-7: The links between the Incentive Mechanism 'Piece Rates/Commission' and the 13 PICs, as well as its own FIMs

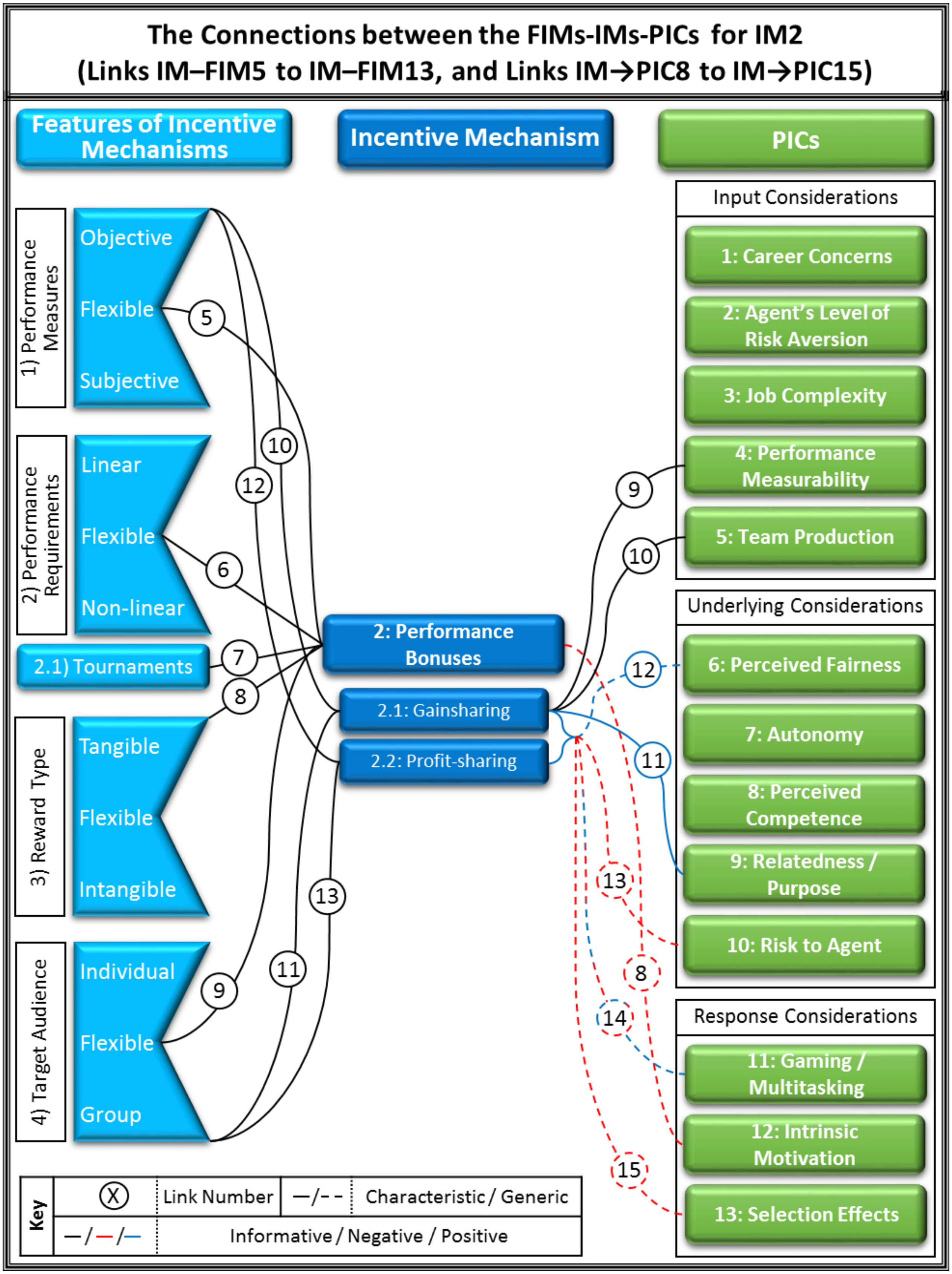


Figure 10-8: The links between the Incentive Mechanism 'Performance Bonuses' and the 13 PICs, as well as its own FIMs

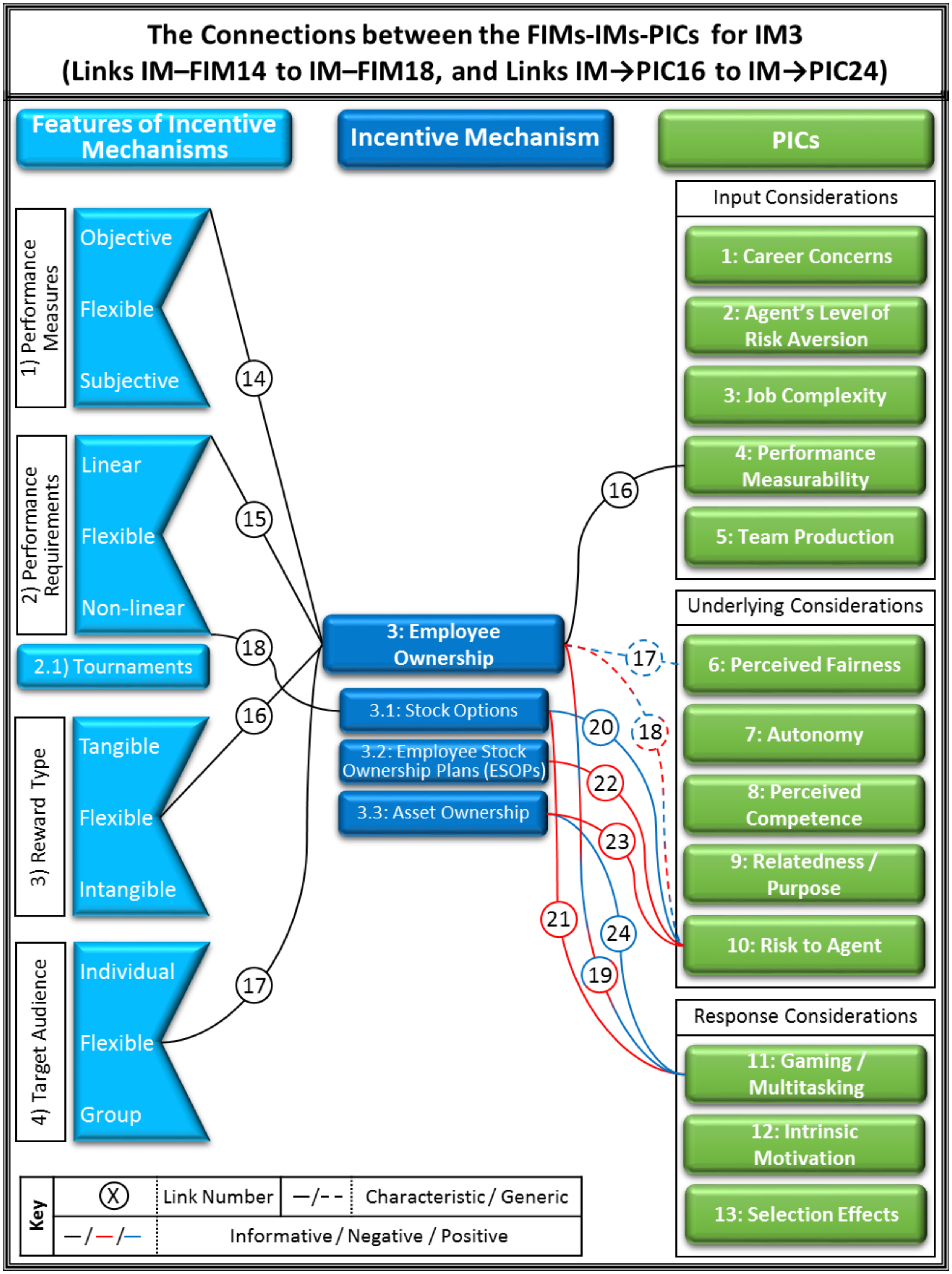
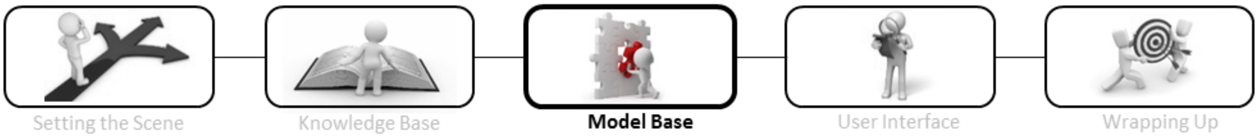


Figure 10-9: The links between the Incentive Mechanism 'Employee Ownership' and the 13 PICs, as well as its own FIMs



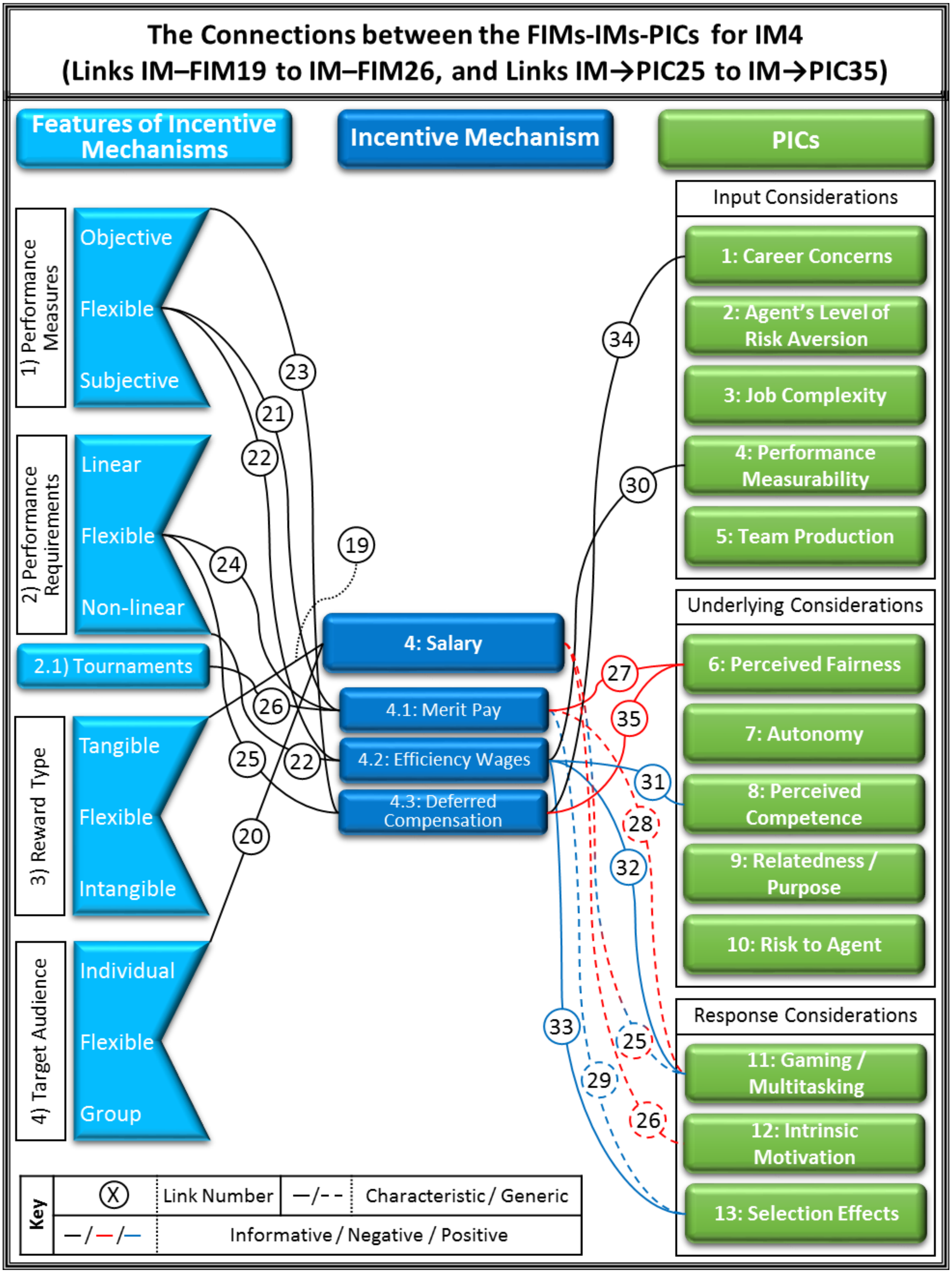
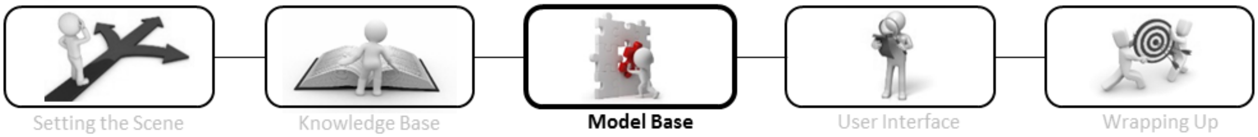


Figure 10-10: The links between the Incentive Mechanism 'Salary' and the 13 PICs, as well as its own FIMs



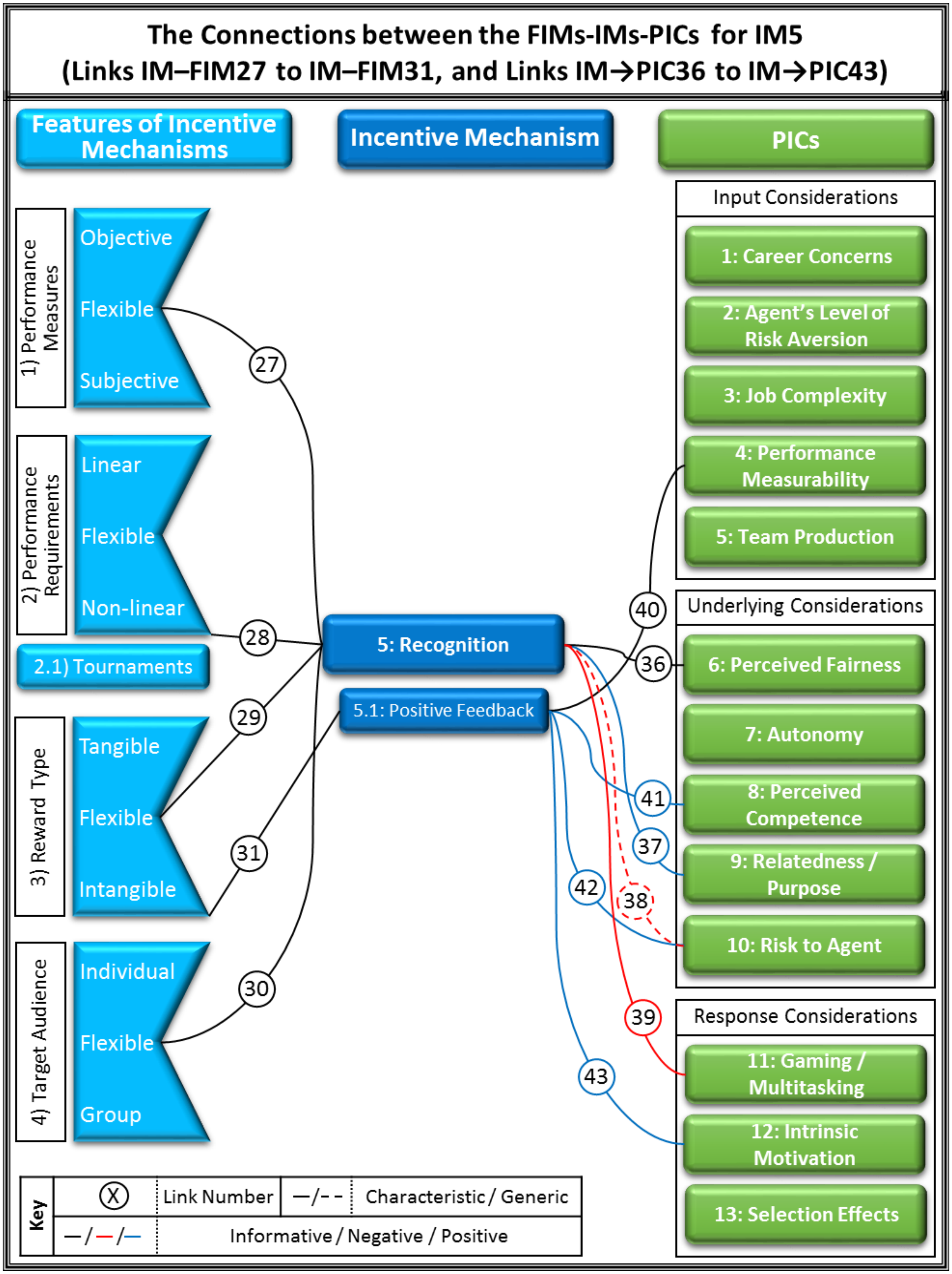


Figure 10-11: The links between the Incentive Mechanism 'Recognition' and the 13 PICs, as well as its own FIMs

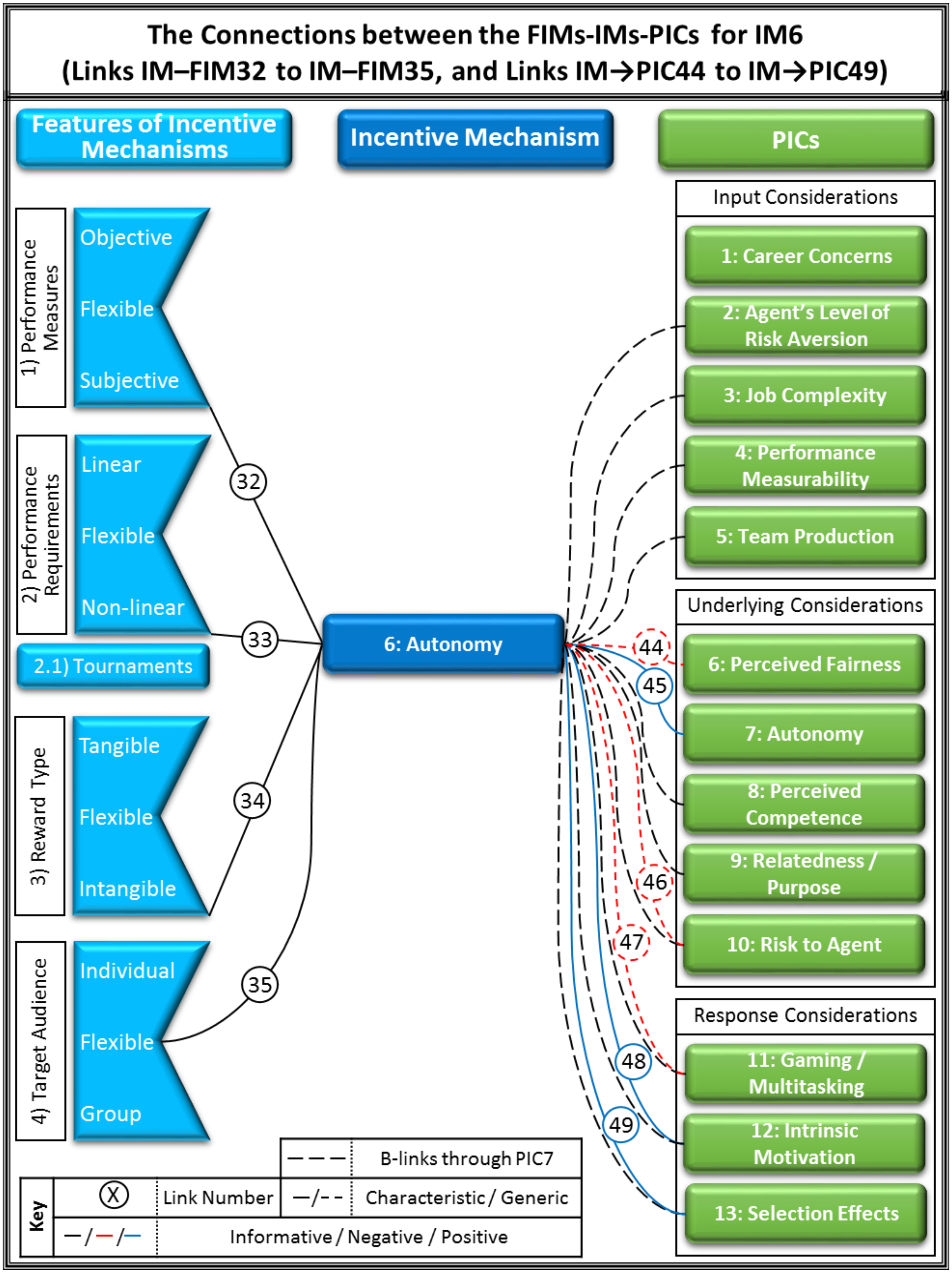
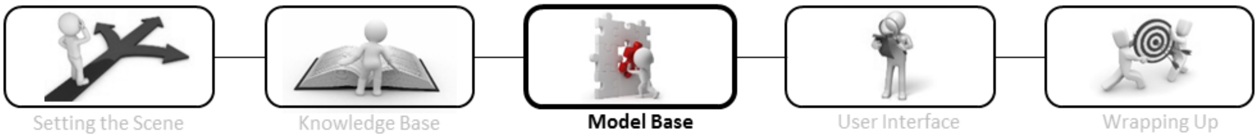


Figure 10-12: The links between the Incentive Mechanism 'Autonomy' and the 13 PICs, as well as its own FIMs



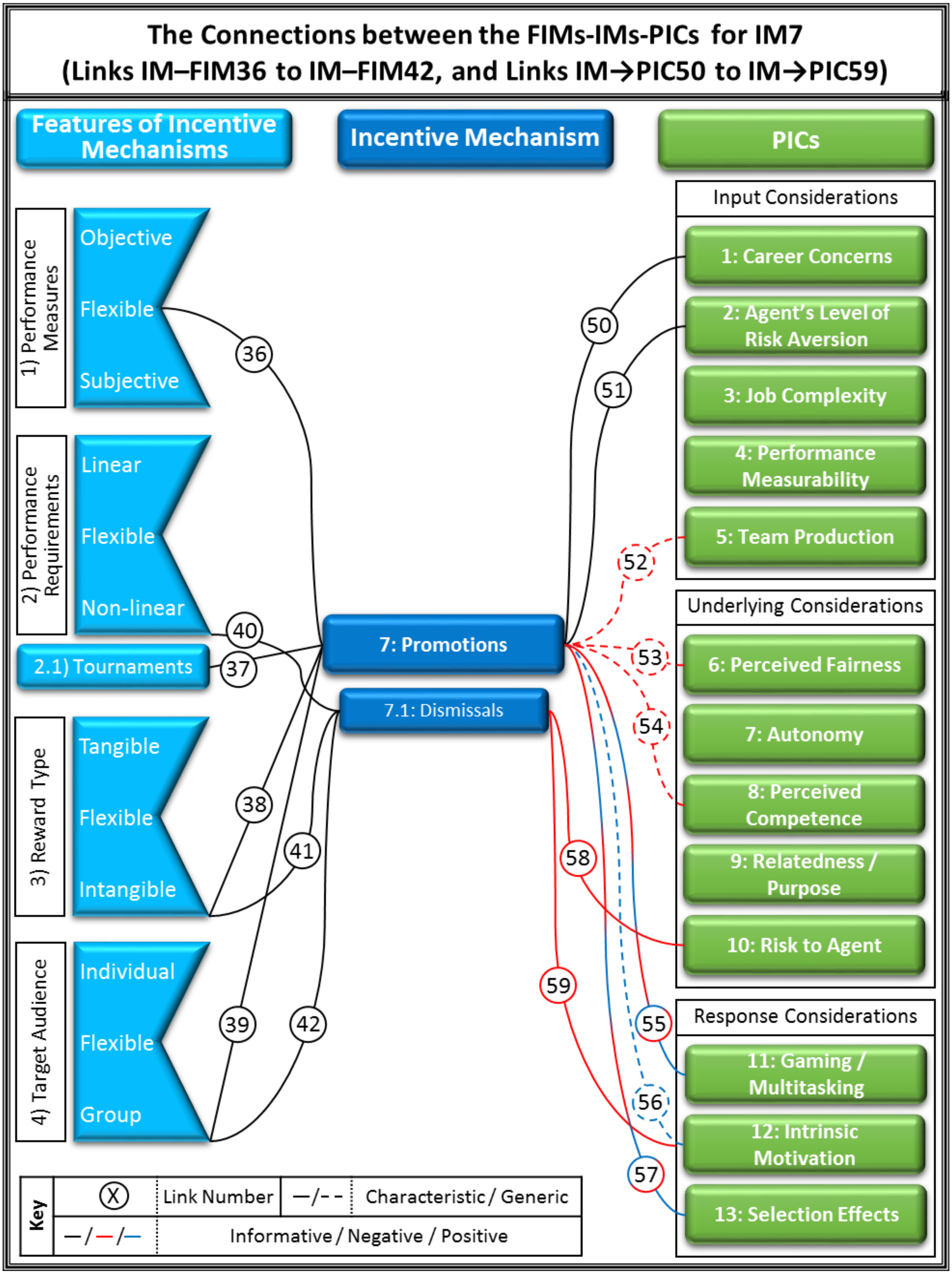


Figure 10-13: The links between the Incentive Mechanism 'Promotions' and the 13 PICs, as well as its own FIMs

10.7) An Overview of the IM→PIC Links (As Listed and Described in Appendix B.3)

This subsection contains an overview of the links between the 13 PICs and the IMs.

Figure 10-7 through Figure 10-13 show the visual representation of Link Model IM→PIC, the links between the PICs and the Incentive Mechanisms (IMs). It includes a designation for each link. This designation can be used to refer to the descriptive list of links in Appendix B.3. The format of the list is as follows:

[Link number)] <u>[Name of IM & PIC that is linked]</u>
[Link Effect, Link Type] **[Summary of the link's effect**: Additional Information.]

Key:

- Link Effect – The IMs and PICs do not all affect each other in the same manner, relationships are:
    - Positive (P) – The use of this IM typically has a positive effect on the linked PIC.
    - Negative (N) – The use of this IM typically has a negative effect on the linked PIC.
    - Informative (I) – A situation where an IM is typically used in a certain manner.
- Link Type – Some links are specific to a certain IM, while other links are worth noting yet generic:
    - Characteristic link (C) – A link between an IM and PIC that characteristically has a certain effect. This is usually specific to the IM.
    - Generic link (G) – A link between an IM and PIC, informed by the links between IMs-FIMs-PICs, due to the configuration of a specific FIM as per the governing FIM→PIC Links.

The information behind the 59 links, link IM→PIC1 to link IM→PIC59, is condensed into approximately 5 500 words as recorded in Appendix B.3. Link IM→PIC33 and link IM→PIC34 are included below as examples of the IM→PIC Links:

IM→PIC33) <u>Salary; Efficiency Wages (IM4.2) & Selection Effects (PIC13)</u>
[PC] **Efficiency Wages has positive Selection Effects:** "The advantage of paying above the market average is the ability to attract and retain the top talent available, which can translate into a highly effective and production workforce" (Noe, Hollenbeck, Gerhart, & Wright, 2006, p. 466). The positive Selection Effects are complemented due to the individual focus of the Incentive Mechanisms as per link FIM→PIC22.

IM→PIC34) <u>Salary; Deferred Compensation (IM4.3) & Career Concerns (PIC1)</u>
[I] **New/young employees with long-term Career Concerns are typically more accepting of Deferred Compensation practices:** Deferred Compensation typically leads to workers being overpaid when they are old at the cost of being underpaid when they are young. Young individuals, or new employees, preoccupied by Career Concerns, "Concerns about the effects of current performance on future compensation" (Gibbons & Murphy, 1992, p. 468), would typically be more willing to accept this practice. "For large enough rents, older workers are willing to exert effort rather than be fired. But rents to older workers are also attractive to younger workers, because exerting effort increases the likelihood of surviving in the firm long enough to attain those rents" (Prendergast, 1999, p. 46).

10.8) An Overview of the IM–FIM Links (As Listed and Described in Appendix B.4)

This subsection contains an overview of the links between the FIMs and the IMs.

Figure 10-7 through Figure 10-13 show the visual representation of Link Model IM–FIM, the links between the Incentive Mechanisms (IMs) and the Features of Incentive Mechanisms (FIMs). It includes a designation for each link. This designation can be used to refer to the descriptive list of links in Appendix B.4. The format of the list is as follows:

[Link number)] [<u>Name of IM & FIM that is linked</u>]
[Summary of the link's effect: Additional Information.]

The information behind the 42 links, link IM–FIM1 to link IM–FIM42, is condensed into approximately 2 500 words as recorded in Appendix B.4. Link IM–FIM37, link IM–FIM38, and link IM–FIM39 are included below as examples of the IM–FIM Links:

IM–FIM37) <u>Promotions (IM7) & Performance Requirements; Tournaments (FIM2.1)</u>
Tournaments are typically used as performance requirements for Promotions: Promotions are typically modelled "as single-period tournaments" (Baker, Jensen, & Murphy, 1988, p. 600) or related to tournament theory (Prendergast, 1999). Adverse effects should be carefully considered as highlighted in link FIM→PIC11 and FIM→PIC14.

IM–FIM38) <u>Promotions (IM7) & Reward Type (FIM3)</u>
The reward type for Promotions as Incentive Mechanism is a promotion: By definition the reward type for Promotions as Incentive Mechanism is a promotion. Even though monetary benefits are typically included, a range of intangible benefits form part of the reward.

IM–FIM39) <u>Promotions (IM7) & Target Audience (FIM4)</u>
The target audience for Promotions as Incentive Mechanism is the better-performing portion of a group of employees: When used as an Incentive Mechanism Promotions target a group of employees. It is noted that this Incentive Mechanism is only effective with employees who expect to have some chance of success; "Incentives will be absent for employees who clearly fall short of the promotion standard" (Baker, Jensen, & Murphy, 1988, p. 600).

10.9) Summary and Conclusion

This subsection concludes Chapter 10: The Relationship between PICs and Incentive Mechanisms.

A total of 59 links were identified between the 13 PICs and the Incentive Mechanisms (IMs). The links are designated link IM→PIC1 to link IM→PIC59, and referred to as the IM→PIC Links. The IM→PIC Links are illustrated in Figure 10-7 through Figure 10-13, separately for each type of IM, and each link is described in Appendix B.3. The IM→PIC Links can be used to understand how the PICs are affected by various IMs. This does not include how the PICs are affected by typical Features of Incentive Mechanisms (FIMs). The FIMs were isolated to reduce the total number of links and make the models more user-friendly. It follows that the IM→PIC Links must be considered alongside the links between the IMs and FIMs, and the FIMs and PICs:

- In all, 42 links were identified between the IMs and the FIMs. The links were designated link IM–FIM1 to link IM–FIM42, and referred to as the IM–FIM Links. The IM–FIM Links are illustrated in Figure 10-7 through Figure 10-13, separately for each type of IM, and each link is described in Appendix B.4. The IM–FIM Links can be used to understand what typical FIMs each IMs has.
- Furthermore, 23 links were identified between the FIMs and the 13 PICs. These links were designated link FIM→PIC1 to link FIM→PIC23, and referred to as the FIM→PIC Links. The FIM→PIC Links are illustrated in Figure 10-5, and each link is described in Appendix B.2. The FIM→PIC Links can be used to understand how the PICs are affected by the FIMs.

When the IM→PIC Links, IM–FIM Links, and FIM→PIC Links are considered together, 124 links describe how the PICs are affected by the IMs. The usability of the models is greatly increased by isolating the FIMs; repeating each FIM for each type of IM would have resulted in a much greater number of links. While the IMs focus on the typical Incentive Mechanisms that are available, the FIMs allow any custom IM to be related to the PICs. The overall usability of the models is thus improved both in terms of comprehensibility and functionality.

When the IMs and FIMs are considered it is found that there are various links with underlying and response considerations, but not with input considerations. The links from IMs/FIMs to input considerations are mostly informative links; that is to say 'a situation where an IM is typically used in a certain manner'. It follows that input considerations generally inform the use of IMs, rather than being able to be influenced by IMs.

This chapter followed a process to identify and describe certain links to help users to make better decisions. If the structured literature review is repeated at some time in the future, and some PICs are added or removed, the process followed in this chapter can be repeated to update links and models to reflect the amended or evolving Knowledge Base.

Chapter 11: The Relationship between the EJD and PICs

11.1) Introduction

This subsection introduces Chapter 11: The Relationship between the EJD and PICs.

A specific PIC can be influenced by, and has connections with other PICs, Incentive Mechanisms (IMs) and Elements of Job Design (EJD). This chapter focuses specifically on the links between the PICs and the EJD as indicated by the EJD→PIC Links in Figure 8-1. Figure 11-1 illustrates how a specific PIC can be influenced, and highlights the type of link that this chapter identifies:

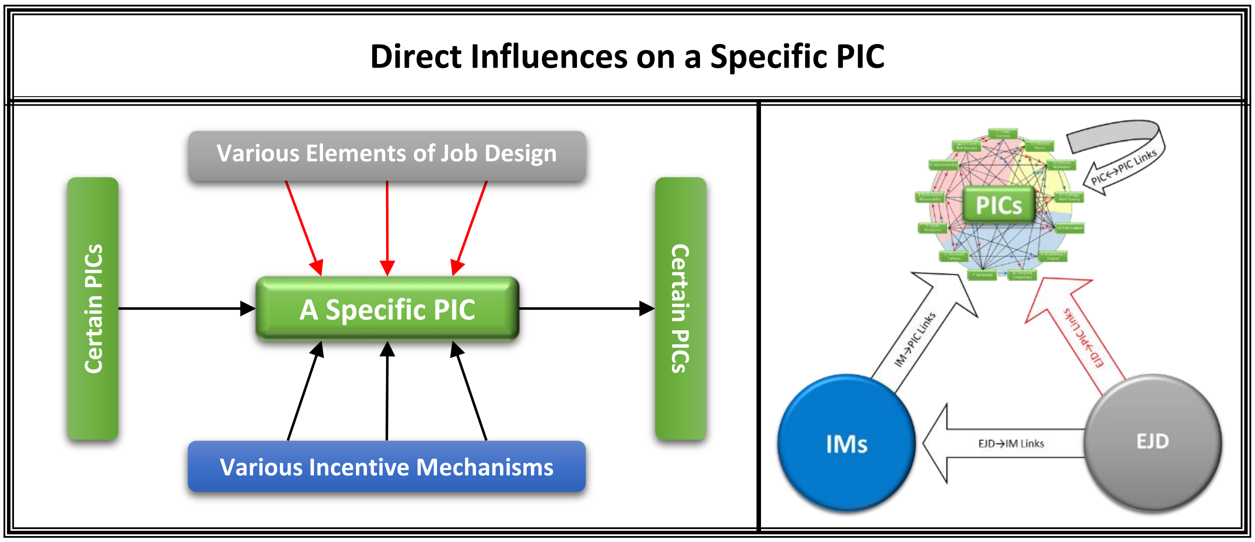


Figure 11-1: The various ways a specific PIC can be influenced

After the links are identified and refined, they are described in sufficient detail and incorporated into a basic model; Link Model EJD→PIC. This chapter is structured as follows:

- Chapter 11.1) Introduction
- Chapter 11.2) Determining the Connections between PICs and the EJD
    - The process used to determine the links between the 13 PICs and the EJD is documented.
- Chapter 11.3) Link Model EJD→PIC (links between PICs and EJD)
    - The final model showing the links between the 13 PICs and the EJD is provided.
- Chapter 11.4) An Overview of the EJD→PIC Links (as listed and described in Appendix B.5)
    - An overview of the links between the 13 PICs and the EJD is provided.
- Chapter 11.5) Summary and Conclusion

11.2) Determining the Connections between PICs and the Elements of Job Design (EJD)

This subsection documents the process used to determine the links between the 13 PICs and the Elements of Job Design.

11.2.1) Approach

This subsection identifies the links between the 13 PICs and the Elements of Job Design (EJD). The links were determined by considering the description of the EJD alongside the description of each specific PIC. This was done systematically for all 286 possible links (13 PICs X 22 EJD). Note that the description of the EJD (Appendix A.4) contains information on their effects or outcomes which is useful when links between PICs and these elements are deduced. The steps that were taken to identify the links are as follows:

1) The first EJD was considered in relation to each PIC, clear connections or links were recorded, and the process was repeated for the remaining 21 EJDs.
2) The links were described in a list, depicted in a figure, and summarised in a table.
3) 2nd-degree links were identified from the links in step 1, depicted on the figure, and summarised in the table.

Note that in step 1 the links were restricted to primary links; EJD that can be used to directly affect a certain PIC. Secondary effects or links were recorded separately. It was found that the secondary links all follow pre-existing connections between the PIC; this supports the validity of the links between the PICs.

11.3) Link Model EJD→PIC (Links between PICs and EJD)

This subsection provides the final model showing the links between the 13 PICs and the EJD.

The investigation identified 26 links between the 22 Elements of Job Design (EJD) and the 13 PICs. The links are designated link EJD→PIC1 to link EJD→PIC26. These links are illustrated in Figure 11-2 below.

Second-degree links can be found by considering the EJD→PIC Links in Appendix B.5 in conjunction with the PIC↔PIC Links in Appendix B.1. Note that this holds only for links between PICs where the directionality is from the PIC linked to the EJD to the next PIC. An example of this would be link EJD→PIC4 linking Feedback from Job to Perceived Competence. Perceived Competence has links to Autonomy (link PIC↔PIC33), Job Complexity (link PIC↔PIC14), and Intrinsic Motivation (link PIC↔PIC39). The directionality is from Autonomy and Job Complexity to Perceived Competence (Perceived Competence is influenced by Autonomy and Job Complexity), and from Perceived Competence to Intrinsic Motivation (Perceived Competence influences Intrinsic Motivation). Feedback from Job thus has a 2^{nd}-degree or indirect link to Intrinsic Motivation but not to Autonomy or Job Complexity.

The description of the EJD suggested various 2^{nd}-degree links. All such links could also be obtained as per the criteria in the previous paragraph. This supports the validity of the links between the 13 PICs.

The investigation identified 99 2^{nd}-degree links. Figure 11-3 illustrates the 1^{st}- and 2^{nd}-degree links. Note the almost fourfold increase. Figure 11-3 is illustrative, but the details are not readable. It is thus complemented by Table D-3 in Appendix D.3. Table D-3 shows the links illustrated in Figure 11-3 in text or coded form.

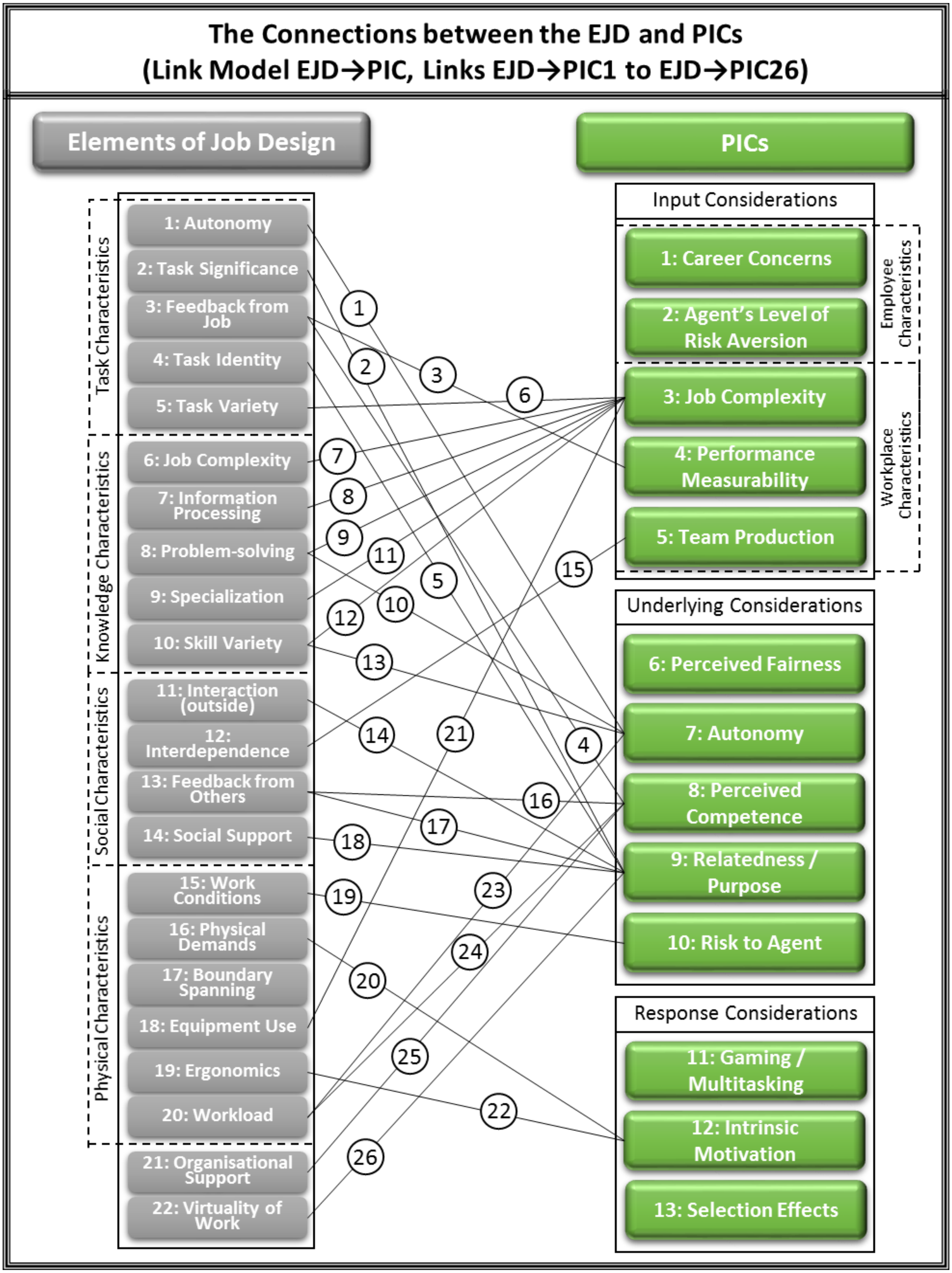
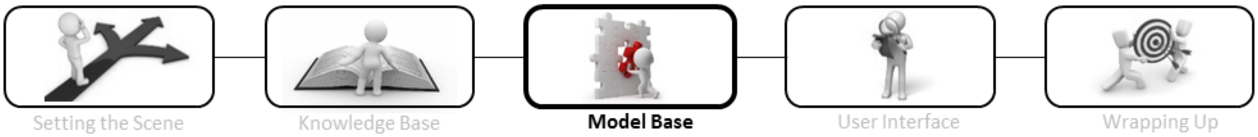


Figure 11-2: The primary or 1st-degree connections between the Elements of Job Design and the 13 PICs



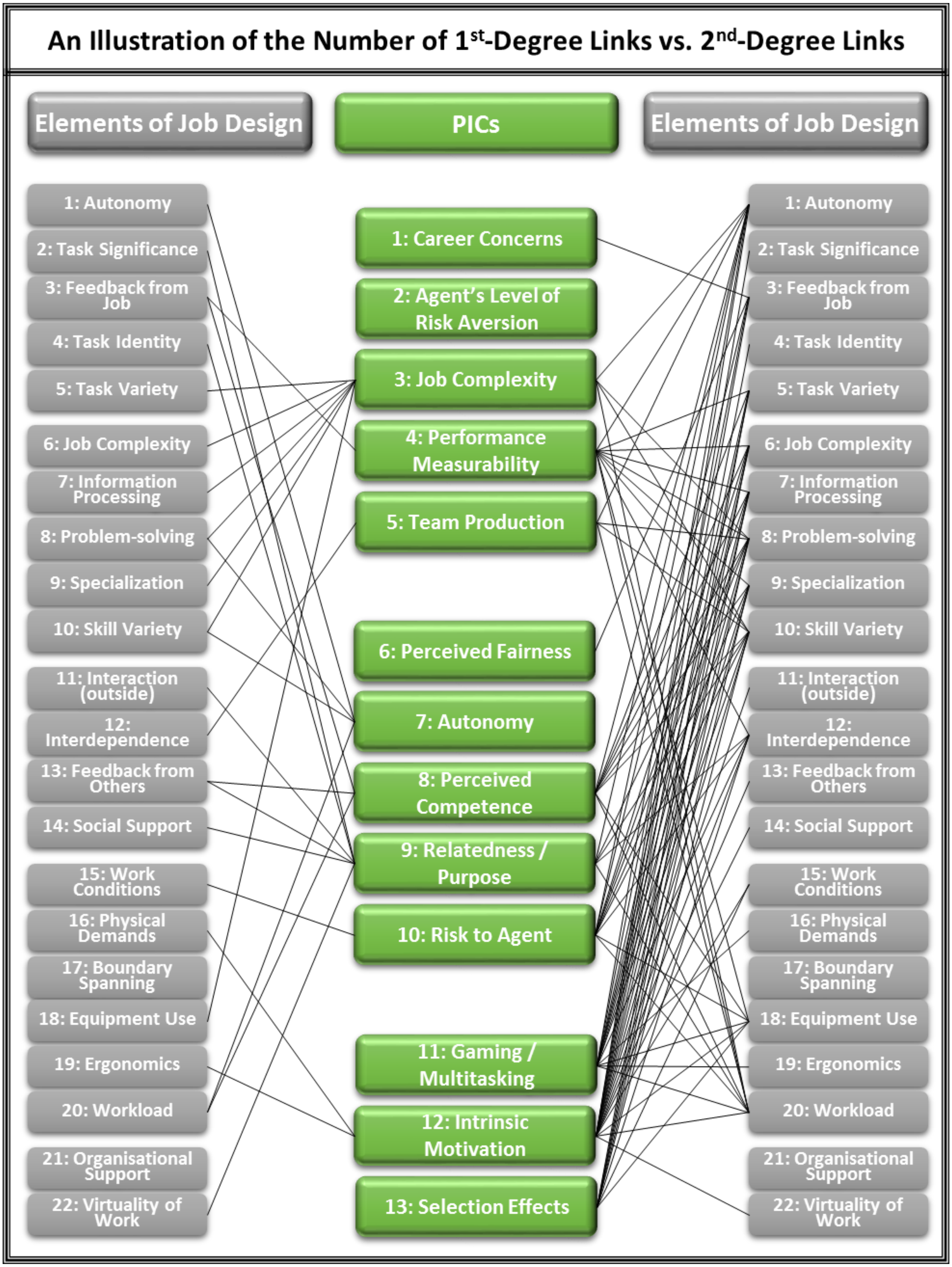


Figure 11-3: An illustration of the number of 1st-degree links vs. the number of 2nd-degree links (25 vs. 99)

11.4) An Overview of the EJD→PIC Links (As Listed and Described in Appendix B.5)

This subsection contains an overview of the links between the 13 PICs and the Elements of Job Design.

Figure 11-2 shows the visual representation of Link Model EJD→PIC, the links between the PICs and Elements of Job Design (EJD). It includes a designation for each link. This designation can be used to refer to the descriptive list of links in Appendix B.5. The format of the list is as follows:

[Link number)] <u>[Name of EJD and & PIC that is linked]</u>
[Summary of the link's effect: Additional Information.]

- [2nd-degree link specifics and further information]

The information behind the 26 links, link EJD→PIC1 to link EJD→PIC26, is condensed into approximately 2 000 words as recorded in Appendix B.5. Link EJD→PIC10, link EJD→PIC11, and link EJD→PIC12 are included below as examples of the EJD→PIC Links:

EJD→PIC10) <u>Problem-solving (EJD8) & Autonomy (PIC7)</u>
High Problem-solving requirements result in (method) Autonomy: When a high degree of unique ideas or solutions are needed in a job an individual will experience a degree of method Autonomy.

- Problem-solving is linked to Risk to Agent and Intrinsic Motivation; limited research suggests effects that can be both satisfying and demanding for the worker. This is partly due to the link between Autonomy and Risk to Agent (link PIC↔PIC35) and the link between Autonomy and Intrinsic Motivation (link PIC↔PIC37) as documented in the connections between PICs section.

EJD→PIC11) <u>Specialisation (EJD9) & Job Complexity (PIC3)</u>
The degree of Specialisation involved with a job affects Job Complexity: The degree to which specialised tasks are performed, or specialised knowledge and skill are needed for job performance affects Job Complexity.

- Specialisation is linked to Intrinsic Motivation; limited research links Specialisation to increased job satisfaction and increased efficiency. This is due to the link between Job Complexity and Intrinsic Motivation (link PIC↔PIC17) as documented in the connections between PICs section.

EJD→PIC12) <u>Skill Variety (EJD10) & Job Complexity (PIC3)</u>
Increasing the Skill Variety in a job increases Job Complexity: The extent to which various skills are needed for job performance will affect Job Complexity.

- Skill Variety is linked to Intrinsic Motivation; Skill Variety is thought to engage workers as using numerous skills in the course of work is challenging. This is partly due to the link between Job Complexity and Intrinsic Motivation (link PIC↔PIC17) as documented in the connections between PICs section.

11.5) Summary and Conclusion

This subsection concludes Chapter 11: The Relationship between the EJD and PICs.

A total of 26 links were identified between the Elements of Job Design (EJD) and the 13 PICs. These links are designated link EJD→PIC1 to link EJD→PIC41, and referred to as the EJD→PIC Links. The EJD→PIC Links are illustrated in Figure 11-2, and each link is described in Appendix B.5. The EJD→PIC Links can be used to understand how the PICs can be affected by the various EJD.

EJD can mostly be used to influence the input and underlying considerations, and not all PICs can be directly affected by the EJD:

- There are 9 links from the EJD to the input considerations, 7 of them with Job Complexity.
- There are 15 links from the EJD to the underlying considerations.
- There are only 2 links from the EJD to the response considerations.

When the Incentive Mechanisms (IMs) and Features of Incentive Mechanisms (FIMs) are considered it was found that there are various links with underlying and response considerations, but not with input considerations. The links from IMs/FIMs to input considerations are mostly informative links; that is to say "a situation where an IM is typically used in a certain manner". It follows that the EJD present the best opportunity to directly affect the input considerations, though this is mainly for Job Complexity. The workplace characteristics can thus be influenced to some degree, but not the employee characteristics. It remains the case that input considerations generally inform the use of IMs, rather than being able to be influenced by IMs.

This chapter followed a process to identify and describe certain links to help users to make better decisions. If the structured literature review is repeated at some time in the future, and some PICs are added or removed, the process followed in this chapter can be repeated to update Link Model EJD→PIC and the EJD→PIC Links to reflect the amended or evolving Knowledge Base.

Chapter 12: The Relationship between IMs and the EJD

12.1) Introduction

This subsection introduces Chapter 12: The Relationship between IMs and the EJD.

A specific PIC can be influenced by, and has connections with other PICs, Incentive Mechanisms (IMs), and Elements of Job Design (EJD). This chapter focuses specifically on the links between the IMs and the EJD as indicated by the EJD→IM Links in Figure 8-1. These links affect specific PICs by improving the use of IMs which in turn affects the PICs as illustrated in Figure 12-1:

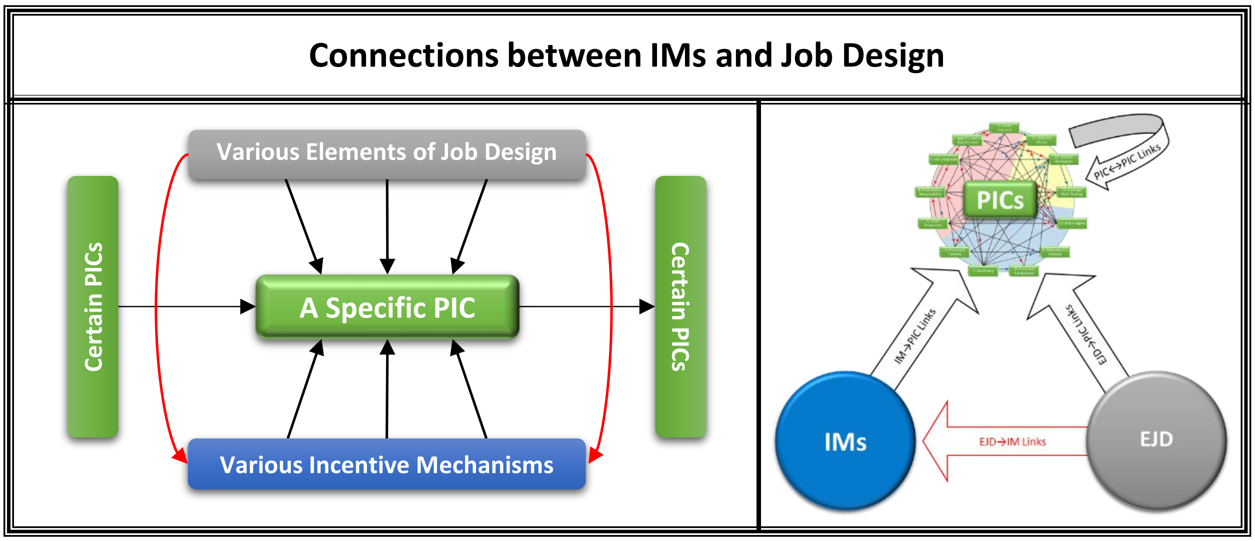


Figure 12-1: The connections between IMs and EJD influence the PICs by improving the effectiveness of the IMs

It is clear that the links between PICs and IMs as well as the links between PICs and Job Design should be considered in order to optimise with respect to the 13 PICs. Is it, however, necessary to consider the links between IMs and Job Design? Job Design can be used to improve the motivation of employees in two ways; firstly by making various changes to improve the PICs directly as recorded in the EJD→PIC Links, and secondly by making various changes to improve the effectiveness of the IMs which in turn improves the PICs. In light of this second point the necessity of considering the links between IMs and Job Design becomes clear. In the words of Wageman & Baker (1997, p. 157), "To Design work without carefully considering the changes that will be in the reward system is likely to lead to inappropriate choices. At the same time, implementing reward systems while taking the design of the task as given will miss important opportunities to enhance performance by altering work designs".

After the links were identified and refined, they were described in sufficient detail, and incorporated into a basic model; Link Model EJD→IM. This chapter is structured as follows:

- Chapter 12.1) Introduction
- Chapter 12.2) Determining the Connections between IMs and the EJD
  - The process used to determine the links between IMs and the EJD is documented.
- Chapter 12.3) Link Model EJD→IM (links between IMs and EJD)
  - The final model showing the links between IMs and the EJD is provided.
- Chapter 12.4) An Overview of the EJD→IM Links (as listed and described in Appendix B.6)
  - An overview of the links between IMs and the EJD is provided.
- Chapter 12.5) Summary and Conclusion

Note that the links drawn in this chapter are not exhaustive, refer to the ‘Scope’ subsection below. Only noteworthy cases where an EJD specifically allows IMs to be used more effectively are highlighted.

12.2) Determining the Connections between IMs and the EJD

This subsection documents the process used to determine the links between IMs and the EJD.

12.2.1) Scope

While the need to consider the links between Incentive Mechanisms (IMs) and Elements of Job Design (EJD) is clear, as argued in the previous subsection, it must be noted that the links will be secondary or indirect when related to the 13 PICs. At the same time much of the information that would populate the EJD→IM Links is already present in the existing links (when considering the IM→PIC Links and EJD→PIC Links together). Consider the classic example where Job Design is used to design better performance measures which improves the effectiveness of certain IMs; Various IMs are linked to Performance Measurability (see links IM→PIC1, 9, 16, 30, and 40 as well as links FIM→PIC1, 8, 10 and 21), Performance Measurability is directly linked to an EJD through link EJD→PIC3 and indirectly linked to various EJD through links EJD→PIC6, 7, 8, 9, 11, 12, and 21 only through link PIC↔PIC12 (when PIC↔PIC Links that have effects directional to Performance Measurability, PIC↔PIC7, 19, and 21, are considered other second-degree links include EJD→PIC15, 1, 10, 13, and 23). In this instance alone 5 Incentive Mechanisms are linked to 11 EJD. The author acknowledges that this is hard to follow, as the links are simply gleaned from the various link models; the User Interface (UI) can guide the user through this process with more ease. While this information could be ascertained by using the UI, it is useful to have a clear picture of how the EJDs can be used to improve IMs directly; this can be a valuable tool in situations where users want to use Job Design to improve specific IMs.

It must be emphasised that the amount of information that would be present if second-degree links between EJD and the IMs were recorded would inflate the amount of information in the model to such an extent that it would become unusable. Consider simply the first- and second-degree links between EJD1 (Autonomy) and the IMs, 50 links are present:

1) EJD→PIC1-IM→PIC45
2) EJD→PIC1-IM–FIM15
3) EJD→PIC1-PIC↔PIC24-IM→PIC2
4) EJD→PIC1-PIC↔PIC24-IM→PIC10
5) EJD→PIC1-PIC↔PIC24-IM→PIC52
6) EJD→PIC1-PIC↔PIC21-IM→PIC1
7) EJD→PIC1-PIC↔PIC21-IM→PIC9
8) EJD→PIC1-PIC↔PIC21-IM→PIC16
9) EJD→PIC1-PIC↔PIC21-IM→PIC30
10) EJD→PIC1-PIC↔PIC21-IM→PIC40
11) EJD→PIC1-PIC↔PIC8-IM→PIC51
12) EJD→PIC1-PIC↔PIC38-IM→PIC7
13) EJD→PIC1-PIC↔PIC38-IM→PIC15
14) EJD→PIC1-PIC↔PIC38-IM→PIC29
15) EJD→PIC1-PIC↔PIC38-IM→PIC33
16) EJD→PIC1-PIC↔PIC38-IM→PIC49
17) EJD→PIC1-PIC↔PIC38-IM→PIC57
18) EJD→PIC1-PIC↔PIC37-IM→PIC6
19) EJD→PIC1-PIC↔PIC37-IM→PIC8
20) EJD→PIC1-PIC↔PIC37-IM→PIC26
21) EJD→PIC1-PIC↔PIC37-IM→PIC43
22) EJD→PIC1-PIC↔PIC37-IM→PIC48
23) EJD→PIC1-PIC↔PIC37-IM→PIC56
24) EJD→PIC1-PIC↔PIC37-IM→PIC59
25) EJD→PIC1-PIC↔PIC36-IM→PIC5
26) EJD→PIC1-PIC↔PIC36-IM→PIC14
27) EJD→PIC1-PIC↔PIC36-IM→PIC19
28) EJD→PIC1-PIC↔PIC36-IM→PIC21
29) EJD→PIC1-PIC↔PIC36-IM→PIC24
30) EJD→PIC1-PIC↔PIC36-IM→PIC25
31) EJD→PIC1-PIC↔PIC36-IM→PIC28
32) EJD→PIC1-PIC↔PIC36-IM→PIC32

33) EJD→PIC1-PIC↔PIC36-IM→PIC39
34) EJD→PIC1-PIC↔PIC36-IM→PIC47
35) EJD→PIC1-PIC↔PIC36-IM→PIC55
36) EJD→PIC1-PIC↔PIC35-IM→PIC4
37) EJD→PIC1-PIC↔PIC35-IM→PIC13
38) EJD→PIC1-PIC↔PIC35-IM→PIC18
39) EJD→PIC1-PIC↔PIC35-IM→PIC20
40) EJD→PIC1-PIC↔PIC35-IM→PIC22
41) EJD→PIC1-PIC↔PIC35-IM→PIC23
42) EJD→PIC1-PIC↔PIC35-IM→PIC38
43) EJD→PIC1-PIC↔PIC35-IM→PIC42
44) EJD→PIC1-PIC↔PIC35-IM→PIC46
45) EJD→PIC1-PIC↔PIC35-IM→PIC58
46) EJD→PIC1-PIC↔PIC34-IM→PIC11
47) EJD→PIC1-PIC↔PIC34-IM→PIC37
48) EJD→PIC1-PIC↔PIC33-IM→PIC31
49) EJD→PIC1-PIC↔PIC33-IM→PIC41
50) EJD→PIC1-PIC↔PIC33-IM→PIC54

This subsection does not, therefore, seek to consolidate all the first- and second-degree links between IMs and the EJD, especially not through the PICs or PIC↔PIC Links. Instead the focus is to highlight where Job Design can be used to improve the effectiveness of IMs.

12.2.2) Approach

This subsection identifies the links between the EJD and IMs. The links were determined by considering the description of the EJD alongside the description of the IMs. This was done systematically; each EJD was considered in relation to each IM.

The steps that were followed was as follows:

1) The first EJD was considered in relation to each IM, and clear connections or links were recorded.
2) The first EJD was considered in relation to each IM through their connection with the 13 PICs as per the IM→PIC Links and the EJD→PIC Links; if both an IM and EJD were linked to the same PIC the existence of a direct connection was considered based on the respective IM→PIC Links and EJD→PIC Links.
3) As a final check, step 2 was repeated for second-degree links; cases where an IM and an EJD were connected to PICs that are connected through the PIC↔PIC Links.
4) Steps 1 through 3 were repeated for the remaining 21 EJD.
5) The links were described in a list, depicted on a figure, and summarised in a table.

Note that in step 1 the links were restricted to primary links; EJD that can be used to directly affect a certain IM or FIM. Secondary effects are not recorded as per the discussion in the previous subsection; only cases where and EJD can be used to directly improve the effectiveness of a certain IM are recorded.

12.2.3) Specific Considerations

This subsection provides some background as to why certain links are recorded, or not recorded, in Link Model EJD→IM. The whole process is not described here, only relevant considerations for specific EJDs:

1) Autonomy (EJD1): Autonomy is an EJD, but also an IM (IM6) and one of the 13 PICs (PIC7). While EJD1 can be linked indirectly to all IMs, refer to the 50 links recorded in the 'scope' subsection above, the primary use of Autonomy as an EJD is in relation to IM6. EJD1 enables the reward type required in FIM3 for IM6 to be implemented.

2) Task Significance (EJD2): No direct effect on the use of IMs, the primary use of Task Significance is to redesign a job to enhance PIC9. Various indirect links exist which are not recorded in this chapter.
3) Feedback from Job (EJD3): Designing jobs to impart information about an individual's performance enables the use of objective performance measures. This can improve the use of performance contingent IMs that rely on objective performance measures.
4) Task Identity (EJD4): The primary use of Task Identity is to redesign a job to enhance PIC9. Designing a job so that an entire piece of work is done by an individual does have some bearing on Piece Rates however. While the 'units' for Piece Rates are usually small, Piece Rates could also be applied to larger 'units'.
5) Task Variety (EJD5): No direct effect on the use of IMs, the primary use of Task Variety is to redesign a job to enhance PIC3. Various indirect links exist which are not recorded in this chapter.
6) EJD that modify Knowledge Characteristics (EJD6, EJD7, EJD8, EJD9, EJD10): The EJD Job Complexity, Information Processing, problem-solving, Specialisation, and Skill Variety have no direct effect on the use of IMs; they can all be used to modify PIC3 (Job Complexity) which results in various indirect links which are not recorded in this chapter.
7) Interaction outside the organisation (EJD11): No direct effect on the use of IMs, the primary use of Interaction outside the organisation is to redesign a job to enhance PIC9. Various indirect links exist which are not recorded in this chapter.
8) Interdependence (EJD12): The facets of Interdependence (between jobs/roles, teams, and rewards or goals) can have an influence on various IMs. Specifically IMs that focus on individuals or groups.
9) Feedback from Others (EJD13): The primary use of Feedback from Others is to redesign a job to enhance PIC8 and PIC9. Feedback from Others also allows subjective performance evaluations to be used, "Job Design can affect the transparency of one worker's actions to others" (Kreps, 1997, p. 359), this improves various IMs that use subjective performance measures. Designing a job so that employees provide information about job performance can also enable the use and effectiveness of IM5 (Recognition).
10) Social Support (EJD14): No direct effect on the use of IMs, the primary use of Social Support is to redesign a job to enhance PIC9. Various indirect links exist which are not recorded in this chapter.
11) Work Conditions (EJD15): No direct effect on the use of IMs, the primary use of Work Conditions is to redesign a job to enhance PIC10. Various indirect links exist which are not recorded in this chapter.
12) Physical Demands (EJD16): No direct effect on the use of IMs, the primary use of Physical Demands is to redesign a job to enhance PIC12. Various indirect links exist which are not recorded in this chapter.
13) Equipment Use (EJD18): While the primary use of Equipment Use is to redesign a job to affect PIC3 it can also be used to allow the use of IM3.3, Asset Ownership. Designing the way equipment is used in an organisation can create a situation that allows Asset Ownership to be implemented.
14) Ergonomics (EJD19): No direct effect on the use of IMs, the primary use of Ergonomics is to redesign a job to enhance PIC12. Various indirect links exist which are not recorded in this chapter.
15) Workload (EJD20): No direct effect on the use of IMs, the primary use of Workload is to redesign a job to enhance PIC7 and PIC8. Various indirect links exist which are not recorded in this chapter.
16) Virtuality of Work (EJD22): No direct effect on the use of IMs, the primary use of Virtuality of Work is to redesign a job to enhance PIC9. Various indirect links exist which are not recorded in this chapter.

12.3) Link Model EJD→IM (Links between IMs and EJD)

This subsection provides the final model showing the links between Incentive Mechanisms and the Elements of Job Design.

The investigation identified 14 links between the 22 Elements of Job Design (EJD) and the Incentive Mechanisms (IMs). The links are designated link EJD→IM1 to link EJD→IM14. These links are illustrated in Figure 12-2 below. Figure 12-2 is a visual illustration of the links between the EJD and the IMs. It can be used to easily find which EJD can be used to improve the use of which IM. A description of each link can be found in the subsection below.

When Figure 12-2 is considered it must be kept in mind that:

- Various IMs have subcategories. In these cases the links between the parent element and the EJDs hold for the subcategories as well, unless the subcategory has a specific link that overrides the parent link.
- While directionality is not shown in the figure it is always from the EJD to the IM. The directionality is implied in the definition of Job Design; this subsection investigates how EJD can be used to influence IMs.

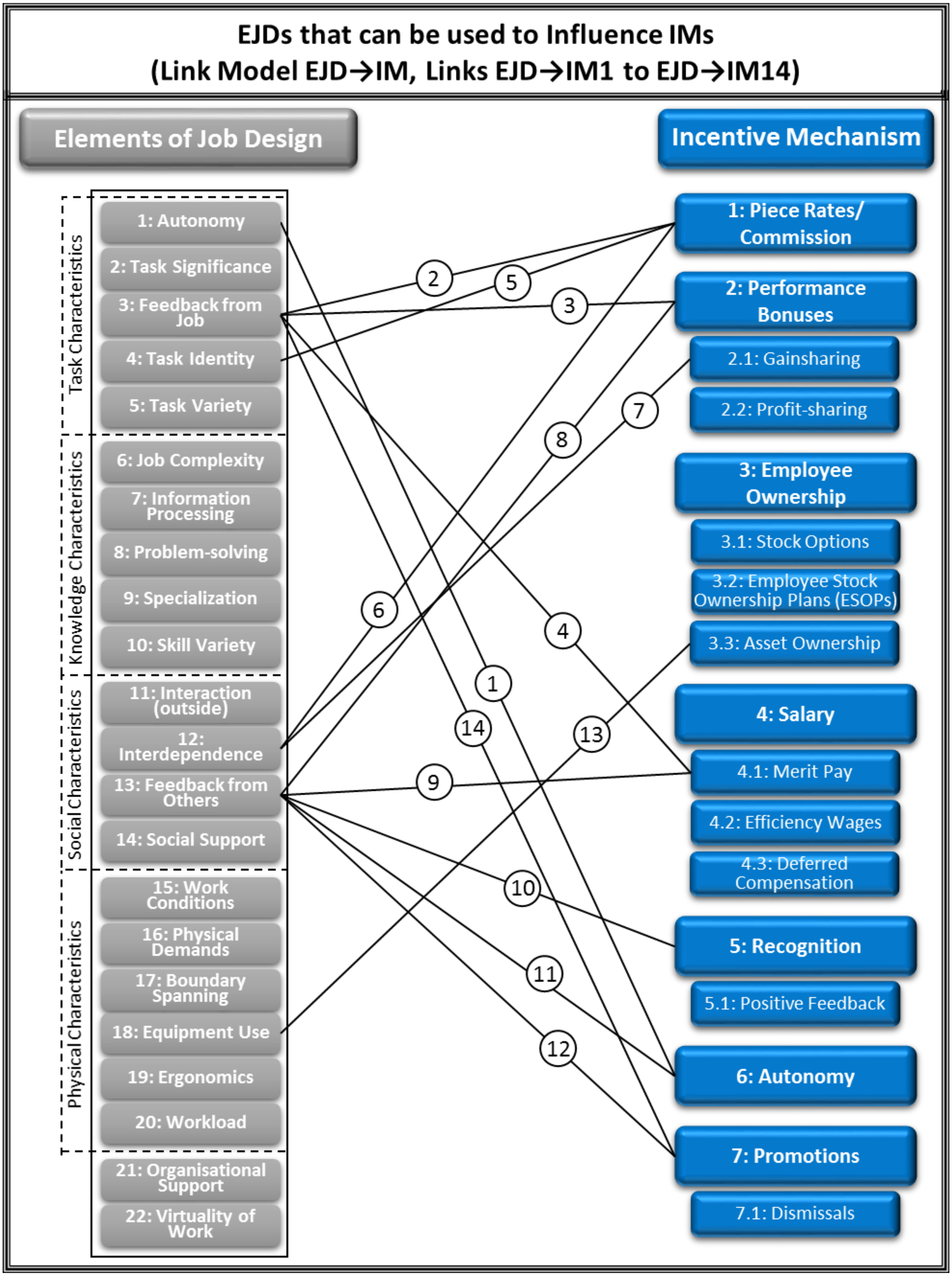


Figure 12-2: Instances where EJD can be used to influence IMs

12.4) An Overview of the EJD→IM Links (As Listed and Described in Appendix B.6)

This subsection contains an overview of the links between Incentive Mechanisms and the Elements of Job Design.

Figure 12-2 shows the visual representation of Link Model EJD→IM, the links between the Incentive Mechanisms (IMs) and the Elements of Job Design (EJD). It includes a designation for each link. This designation can be used to refer to the descriptive list of links in Appendix B.6. The format of the list is as follows:

[Link number)] <u>[Name of EJD and & IM that is linked]</u>
[Summary of the link's effect: Additional Information.]

The information behind the 14 links, link EJD→IM1 to link EJD→IM14, is condensed into approximately 1 000 words as recorded in Appendix B.6. Link EJD→IM4, link EJD→IM5, and link EJD→IM6 are included below as examples of the EJD→IM Links:

EJD→IM4) <u>Feedback from Job (EJD3) & Merit Pay (IM4.1)</u>
Designing jobs to give better feedback improves the effectiveness of Merit Pay: Merit Pay is often, at least partly, based on objective performance measures. If a job provides better feedback concerning an individual's performance the accuracy and effectiveness of Merit Pay can be improved.

EJD→IM5) <u>Task Identity (EJD4) & Piece Rates (IM1)</u>
Designing jobs so that an individual completes an entire piece of work allows the use of Piece Rates: Piece Rates is based on a physical measurement of units produced or actions performed. If a job can be designed in such a way that such 'units' can be distinguished the use of Piece Rates becomes possible. Task Identity has some bearing on this as it is concerned with designing a job so that an individual completes an entire piece of work.

EJD→IM6) <u>Interdependence (EJD12) & Piece Rates (IM1)</u>
Designing jobs so that there is little Task Interdependence improves the effectiveness of Piece Rates: As Piece Rates focus on an individual's performance it works well in settings where employees are not dependent on each other. Designing a job so that there is no Task Interdependence allows the Piece Rates to be used more effectively.

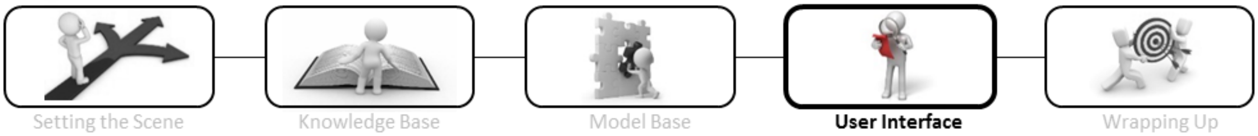
12.4) Summary and Conclusion

This subsection concludes Chapter 12: The Relationship between the Incentive Mechanisms and the Elements of Job Design.

A total of 14 links were identified between the Elements of Job Design (EJD) and the Incentive Mechanisms (IMs). These links are designated link EJD→IM1 to link EJD→IM14, and referred to as the EJD→IM Links. The EJD→IM Links are illustrated in Figure 12-2, and each link is described in Appendix B.6. The EJD→IM Links can be used to understand how the EJD can improve the use of IMs.

While not all IMs can be influenced by the EJD, the EJD can improve the use of most IMs in some fashion. It was found that the EJD cannot influence the response considerations to a significant degree directly in Chapter 11; Chapter 12 shows that the EJD can have a great influence on the PICs indirectly, and the response considerations specifically, through the IMs (as illustrated in Figure 11-3).

This chapter followed a process to identify and describe certain links to help users to make better decisions. If the structured literature review is repeated at some time in the future, and some PICs are added or removed, the process followed in this chapter can be repeated to update Link Model EJD→IM and the EJD→IM Links to reflect the amended or evolving Knowledge Base.



SECTION D: USER INTERFACE (UI)

Chapter 13 to Chapter 16 develop a User Interface (UI) concept that users use to interact with the Knowledge Base (KB) and the Model Base (MB). The UI has been developed to such a degree that the DSS's use can be demonstrated, but not to such a degree that the DSS is ready for commercial use. An Integrated Links Model (ILM) and Cascading Effects Models (CEMs) are provided to complement the existing models in the MB, and opportunities for further development are discussed.

SECTION D[6] proceeds as follows:

- Chapter 13 outlines the **Scope and Aim/Purpose of the User Interface**.
- Chapter 14 introduces and describes **The Integrated Links Model (ILM)**.
- Chapter 15 introduces and describes **Cascading Effects Models (CEMs)**.
- Chapter 16 discusses how to move **Towards a Mature User Interface**.

[6] It must be noted that it is difficult to make a clear distinction between the MB and the UI. The visual constructs developed as part of the MB function as components of the UI; users interact with them to understand what is going on in the MB and KB. The basic visual representation of the various link models can be found in SECTION C. SECTION D develops further models and visuals that help users to interact with the MB and KB in a more efficient manner.

Chapter 13: Scope and Aim/Purpose of the User Interface (UI)

"If I had asked people what they wanted,

they would have said faster horses."

-Henry Ford

13.1) Introduction

This subsection introduces Chapter 13: Scope and Aim/Purpose of the User Interface.

Recall that the User Interface (UI), the third and final component of the Decision Support System (DSS), is "the interface that the user utilises to interact with the Model Base and Knowledge Base". SECTION D is consequently not focused on generating new information, but rather configures and communicates the information that can be found in the Knowledge Base (KB) and Model Base (MB) in a more effective manner. As per Chapter 1.3.3.3 and Figure 1-4, this section specifically seeks to move the state of knowledge to a higher level where usability is clearer and more immediate.

While the MB, and especially the KB, are well developed, a mature UI has not been developed. The aim of this research is not to deliver a fully functional commercial product, but to lay the groundwork for a suitable DSS. It follows that an extensive structured literature review was conducted to produce a detailed and reliable KB. This could then be used to develop a sound MB, which forms the foundation of the UI. The UI has however only been developed to such a degree that the DSS's use can be demonstrated. This results in a DSS that is usable, but with a rudimentary UI. The theoretical foundation is laid and the prospective use is demonstrated, but further product development is outside the research's scope.

Chapter 13 outlines the purpose and scope of the DSS's User Interface. This is followed by the introduction of the conceptualisation of the information behind the DSS as a complex spiderweb. The chapter closes with an overview of the various figures and illustrations that form part of the User Interface. This chapter is structured as follows:

- Chapter 13.1) Introduction
  - An overview of the purpose and scope of the DSS's User Interface.
- Chapter 13.2) Visualising the DSS as a Complex Spiderweb
  - The conceptualisation of the information behind the DSS as a complex spiderweb is introduced.
- Chapter 13.3) User Interface Overview – What is Included in the UI
  - An overview of the various figures and illustrations that form part of the User Interface is provided.
- Chapter 13.4) Summary

13.2) Visualising the DSS as a Complex Spiderweb

This subsection introduces the conceptualisation of the information behind the DSS as a complex spiderweb.

Presenting the information in the Knowledge Base (KB) and Model Base (MB) to users in a fashion that is easy to understand, usable, and not overwhelming can be challenging. It is thus helpful to start by sketching a simple ‘big picture’ with the help of an analogy. This helps users to understand how everything fits together, without being overwhelmed by the details. The information behind the DSS is accordingly conceptualised as a complex spiderweb; this forms the basis for further sub-models such as the Integrated Links Model (ILM) and the Cascading Effects Models (CEMs). An illustration of a complex spiderweb is provided in Figure 13-1.

Complex Spiderweb Illustration

Figure 13-1: Complex Spiderweb Illustration – Credit to Tomás Saraceno (Saraceno, 2016)

The main purpose of the complex spiderweb analogy is to emphasise interconnectedness. Each of the knots, or nodes (Figure 13-1 top-right and -left), is connected to any number of other nodes. When one node is pulled, other nodes will be affected; some directly, and some indirectly. In a similar fashion the various link models presents various nodes (13 PICs, 4 FIMs, 22 EJD, and 17 IMs) that have various links or connections between them (41 PIC↔PIC Links, 59 IM→PIC Links, 26 EJD→PIC Links, 23 FIM→PIC Links, 42 IM–FIM Links, and 14 EJD→IM Links). The various links between the nodes reflect the various links between the PICs, Features of Incentive Mechanisms (FIMs), Elements of Job Design (EJD), and Incentive Mechanisms (IMs). This emphasises the importance of noting that a node does not exist in a vacuum, but is connected to various other nodes; one must not modify or alter a PIC for example, without being aware of the effect that this will have on numerous other nodes.

The various link models contain a total of 205 1st-degree links between the 56 nodes. This cannot be illustrated on single basic model. The visual representation of the various link models as a complex web is thus configured to centre on the 13 PICs, which is an appropriate focus as per the definition of the PICs. Figure 13-2 illustrates this visual representation; the 13 PICs and the links between them are shown at the centre, the outside ring illustrates that various FIMs, IMs, and EJD are linked to the PICs.

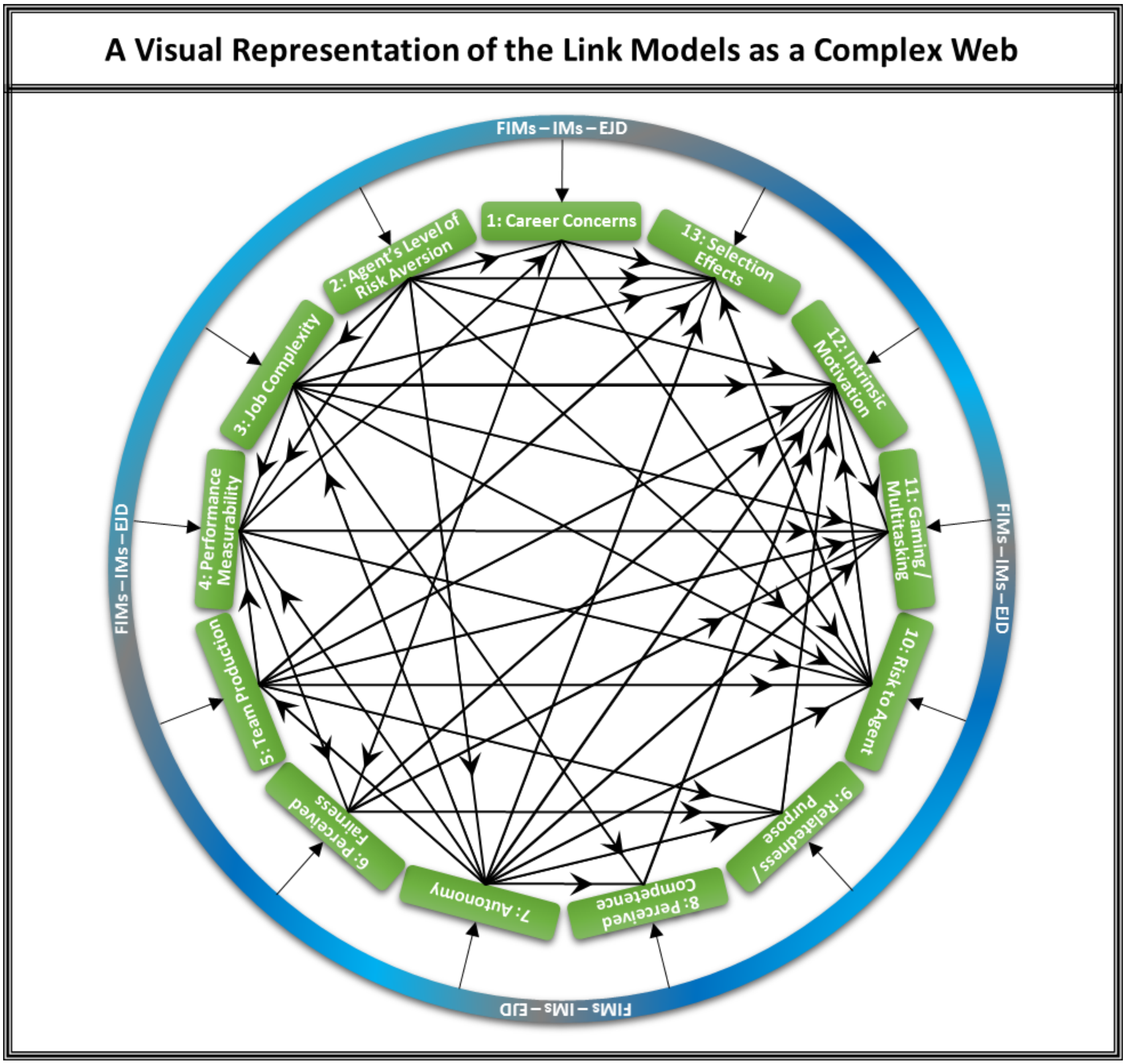


Figure 13-2: A visual representation of the various link models as a complex web

It must be noted that using the model to make decisions cannot be restricted to first-degree links, the interconnected nature of the nodes demands that at least 2nd-degree links be considered to understand the effects of decisions. Taking 2nd-degree links into account results in an intricate model with thousands of links (see Table 14-1). In order to help users use the various link models, an Integrated Links Model (Chapter 14) and Cascading Effects Models (Chapter 15) are provided. These models collect all the relevant links to a specific PIC or IM from the various link models and presents them in a single location.

13.3) User Interface Overview – What is Included in the UI

This subsection gives an overview of the various figures and illustrations that form part of the User Interface.

While this section only introduces the Integrated Links Model (ILM) and Cascading Effects Model (CEMs), following the conceptualisation of the link models as a complex web, various other constructs make up the rudimentary User Interface (UI). As a whole the UI could be said to include (illustration provided in Figure 13-3):

- The various link models and the information lists associated with them:
    - Link Model PIC↔PIC (the links between the PICs as shown in Figure 9-10).
    - Link Model IM→PIC and Link Model IM–FIM (the links between the PICs and IMs, and the links between IMs and FIMs, as shown in Figure 10-7 through Figure 10-13).
    - Link Model FIM→PIC (the links between the PICs and FIMs as shown in Figure 10-5).
    - Link Model EJD→IM (the links between IMs and EJD as shown in Figure 12-2).
    - Link Model EJD→PIC (the links between the PICs and EJD as shown in Figure 11-2).
- The overview of the link models and how they interact with each other (Figure 8-1).
- The conceptualisation of the various link models as a complex web (Figure 13-1):
    - A visual representation of the various link models as a complex web (Figure 13-2).
    - A basic model depicting the connection between PICs, IMs, and EJD (Figure 2-3).
- The ILM Segments (Figure 14-2 through Figure 14-14).
- The CEMs (Figure 15-2 through Figure 15-18).
- The Rudimentary DSS User Interface – Information Catalogue*.
- This document.

*"The Rudimentary DSS User Interface – Information Catalogue" is a standalone document that collates the required information to make use of the DSS into one place. This serves the purpose of providing the reader with the DSS information in one place, and illustrates what the DSS UI looks like in its current form. The information catalogue is not included in this document. Its index can be seen in Appendix E.

This represents the UI in its current form. A mature UI could be improved both in terms of providing users with additional material, and in terms of format (electronic vs. manual documentation). Opportunities for further development are discussed in Chapter 16.

A visual overview of the constructs, as listed above, which make up the rudimentary UI can be found in Figure 13-3:

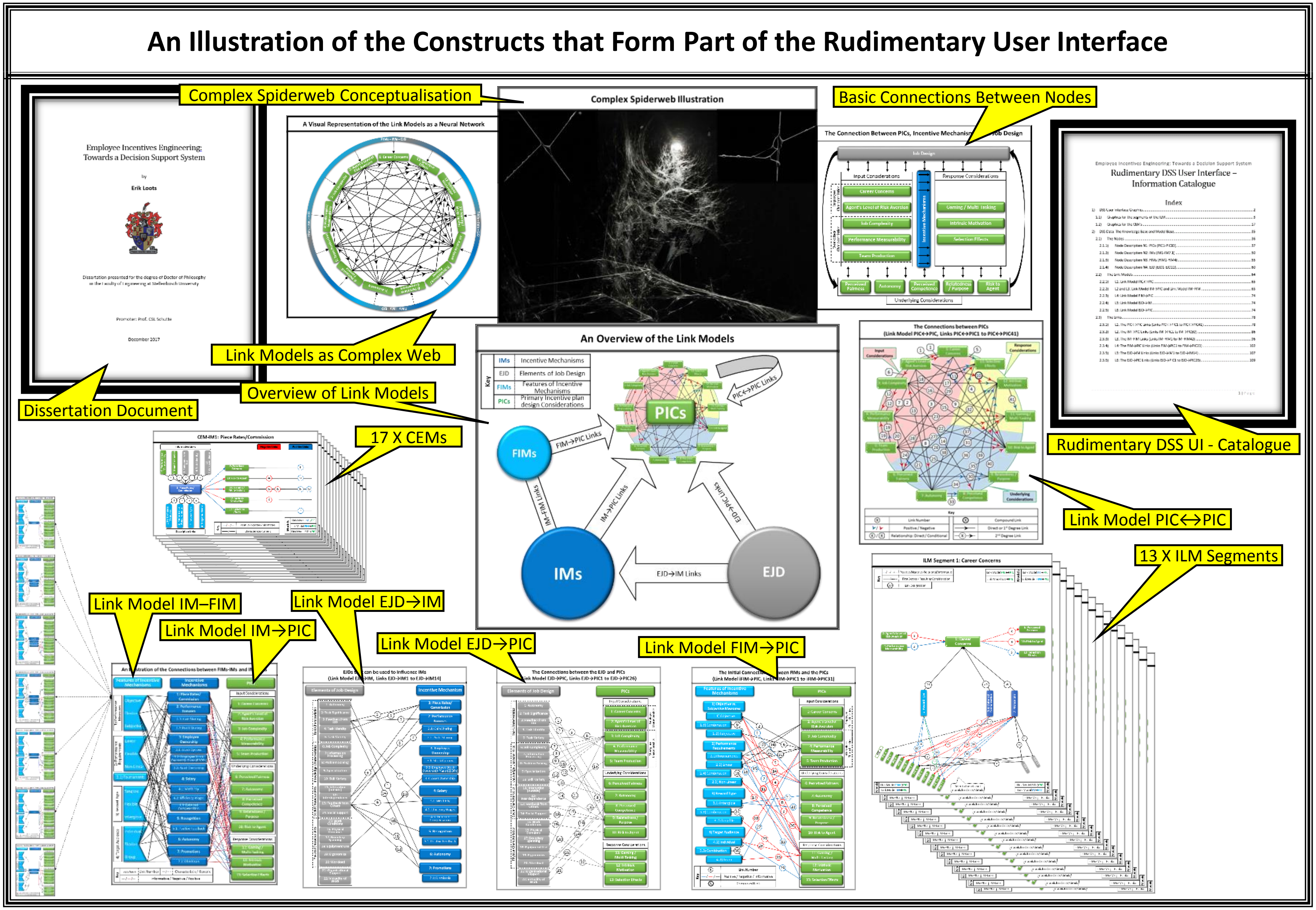


Figure 13-3: An illustration of the constructs that form part of the rudimentary User Interface

13.4) Summary

This subsection concludes Chapter 13: Scope and Aim/Purpose of the User Interface.

The User Interface (UI), the third and final component of the Decision Support System (DSS), is "the interface that the user utilises to interact with the Model Base and Knowledge Base". While the Model Base (MB), and especially the Knowledge Base (KB), are well developed, a mature UI has not been developed. The aim of this research is not to deliver a fully functional commercial product, but to lay the groundwork for a suitable DSS. The UI is accordingly only developed to such a degree that the DSS's use can be demonstrated. This results in a DSS that is usable, but with a rudimentary UI. The theoretical foundation is laid and the prospective use is demonstrated, but further product development is outside the scope of this research.

The UI conceptualises the information in the KB and KB as a complex spiderweb. The various links between the nodes reflects the various links between the PICs, Features of Incentive Mechanisms (FIMs), Elements of Job Design (EJD), and Incentive Mechanisms (IMs). This emphasises the importance of noting that a node does not exist in a vacuum, but is connected to various other nodes; one must not modify or alter a PIC for example, without being aware of the effect that this will have on numerous other nodes.

In its current form, the rudimentary UI can be thought of as consisting of:

- the 6 link models;
- the overview of the link models;
- the conceptualisation of the various link models as a complex spiderweb;
- the Integrated Links Model Segments;
- the Cascading Effects Model;
- the Rudimentary DSS User Interface – Information Catalogue*;
- this document.

Chapter 14: The Integrated Links Model (ILM)

"Step with care and great tact,

and remember that life's a balancing act."

-Dr Seuss

14.1) Introduction

This subsection introduces Chapter 14: The Integrated Links Model.

The Integrated Links Model (ILM) is a collection of 13 segments, each focusing on a specific PIC. Each ILM segment illustrates what one would see when all the links connected to a specific PIC across the various link models are shown.

Chapter 14 introduces the ILM and gives an overview of what it entails. The 13 ILM Segments are constructed and provided accordingly. This chapter is structured as follows:

- Chapter 14.1) Introduction
- Chapter 14.2) Overview of the ILM
    - The Integrated Links Model is introduced and an overview of what it entails is provided.
- Chapter 14.3) The ILM Segments
    - The Integrated Links Model Segments are provided.
- Chapter 14.4) Summary

14.2) Overview of the ILM

This subsection introduces the Integrated Links Model and provides an overview of what it entails.

14.2.1) Introduction and Overview

The Integrated Links Model (ILM) is a collection of 13 segments, each focusing on a specific PIC. Following the perspective provided by the complex spiderweb conceptualisation as per Figure 13-2, the ILM segment is a useful place to start when taking a closer look at the information provided by the DSS. Each ILM segment illustrates what one would see when all the links connected to a specific PIC across the various link models are shown. While the various link models contain a modest total of 205 1st-degree or primary links (41 PIC↔PIC Links, 59 IM→PIC Links, 26 EJD→PIC Links, 23 FIM→PIC Links, 42 IM–FIM Links, and 14 EJD→IM Links), specifying 2nd-degree links increases the number exponentially. The purpose of the ILM is to present this information to users in such a way that they are not overwhelmed. Figure 14-1 illustrates the format of each segment of the ILM and how the links fit together.

It must be noted that using the ILM segments to make decisions cannot be restricted to first-degree links; the interconnected models demand that at least 2nd-degree links be considered to understand the effects of decisions. When the 2nd-degree links are taken into account the 56 node 205 links model becomes very intricate; 2 783 links are to be considered (see Table 14-1). The types of links that must be considered are:

- First-degree links:
    - Direct first-degree links (PIC↔PIC Links, EJD→PIC Links, FIM→PIC Links, and IM→PIC Links that have a direct effect on the focus PIC).
    - Indirect first-degree links (EJD→IM Links that affect the focus PIC through the IMs, note that IM–FIM Links are omitted*).
- Resulting considerations:
- Direct resulting considerations (PIC↔PIC Links from the focus PIC to other PICs).
    - Indirect resulting considerations (EJD→PIC Links , FIM→PIC Links, and IM→PIC Links to other PICs, note that this is only for PICs acting on the focus PIC).
- Second-degree links (Links to the focus PIC via other PICs through the PIC↔PIC Links).

*The information in the IM–FIM Links acts as a description of the Incentive Mechanisms (IMs) in terms of Features of Incentive Mechanisms (FIMs). The IM→PIC and FIM→PIC Links cover the important effects on the PICs. It is thus not necessary to include the IM–FIM Links on each segment; this greatly reduces the congestion on each segment. Where required, the information can be found by consulting the model showing the IM–FIM Links.

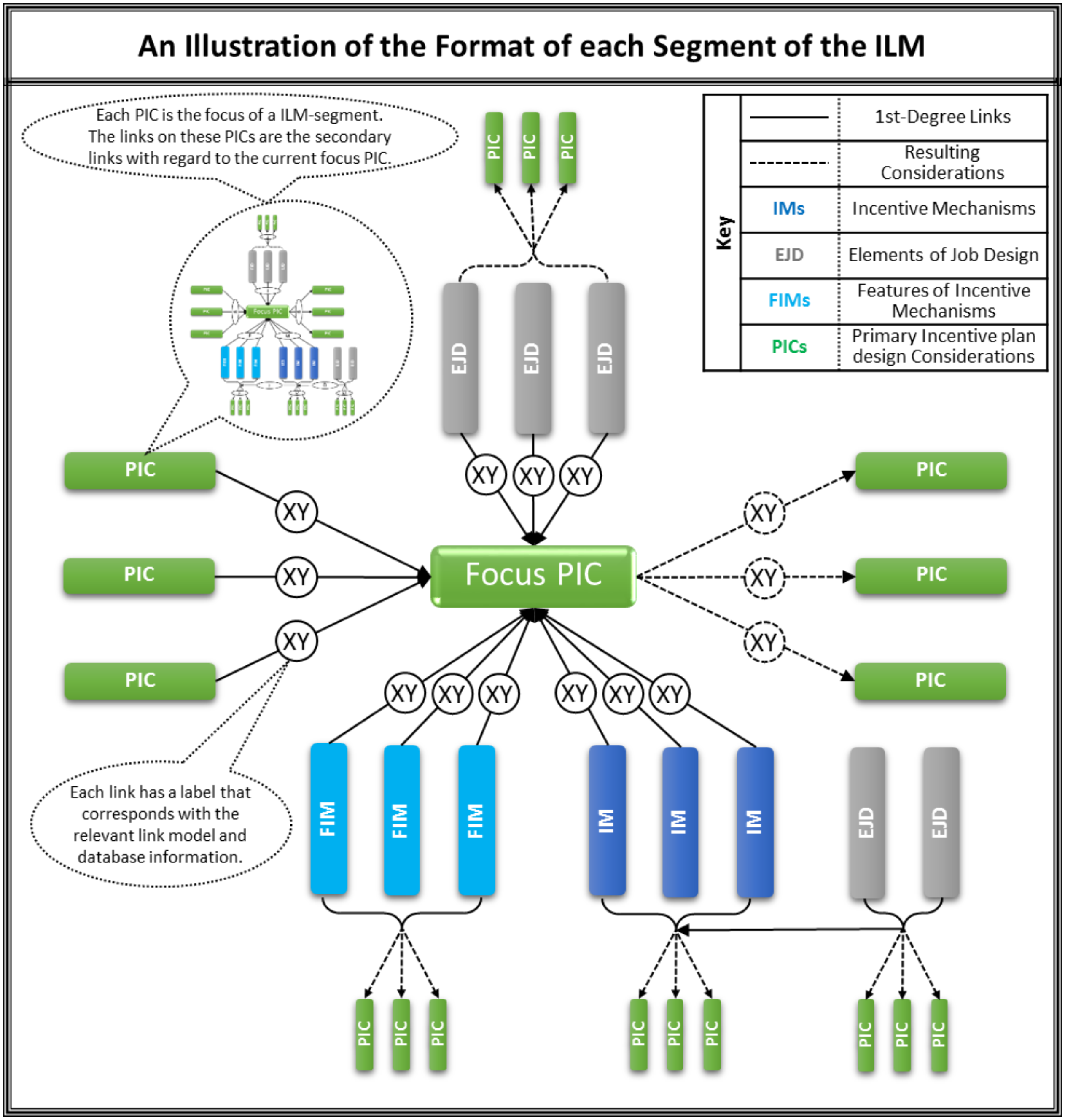


Figure 14-1: An Illustration of the Format of each Segment of the Integrated Links Model

Each segment of the ILM has one of the 13 PICs as its focus. The Elements of Job Design (EJD), Incentive Mechanisms (IMs), and Features of Incentive Mechanisms (FIMs) that have direct links to the specific PIC are accounted for, as well as the other PICs directly linked to the focus PIC. Note that an EJD can influence a PIC directly, but also indirectly through affecting the use of applicable IMs. In order to reduce the number of links in the overall model, typical features of IMs are isolated in the FIMs. IMs thus affect PICs not only directly, but also indirectly through the FIMs. Lastly, other PICs that are affected by the relevant EJD, IMs, FIMs, or the focus PIC, are shown as resulting considerations; this occurs in cases where some action affects the focus PIC, but has other effects on other PICs as well. The total number of links that each segment of the ILM has to account for is shown on Table 14-1:

Table 14-1: The number of 1st- and 2nd-degree links that the ILM has to accommodate for each segment

Links \ 13 Segments	1: Career Concerns	2: Agent's Level of Risk Aversion	3: Job Complexity	4: Performance Measurability	5: Team Production	6: Perceived Fairness	7: Autonomy	8: Perceived Competence	9: Relatedness/Purpose	10: Risk to Agent	11: Gaming/Multitasking	12: Intrinsic Motivation	13: Selection Effects	**Total**
PICs acting on the focus PIC	2	0	2	4	1	2	1	2	3	6	6	8	4	**41**
EJD acting on the focus PIC	0	0	7	1	1	0	4	4	6	1	0	2	0	**26**
FIMs acting on the focus PIC	1	1	0	4	2	3	1	2	0	2	4	1	3	**24**
IM acting on the focus PIC	2	1	0	5	3	9	1	3	2	11	12	7	7	**63**
Direct First-Degree Links	*5*	*2*	*9*	*14*	*7*	*14*	*7*	*11*	*11*	*20*	*22*	*18*	*14*	***154***
EJD acting on the focus PIC through the IMs	2	2	0	7	6	15	2	3	4	14	16	10	14	**95**
Indirect First-Degree Links	*2*	*2*	*0*	*7*	*6*	*15*	*2*	*3*	*4*	*14*	*16*	*10*	*14*	***95***
Total First-Degree Links	**7**	**4**	**9**	**21**	**13**	**29**	**9**	**14**	**15**	**34**	**38**	**28**	**28**	**249**
PICs acted on by the focus PIC	3	7	6	4	6	3	9	1	1	2	0	1	0	**43**
Direct Resulting Considerations	*3*	*7*	*6*	*4*	*6*	*3*	*9*	*1*	*1*	*2*	*0*	*1*	*0*	***43***
Links between linked FIMs and other PICs	4	5	0	14	8	12	4	8	0	7	14	4	12	**92**
Links between linked IMs and other PICs	10	7	0	26	16	41	5	17	10	41	44	26	36	**279**
Links between linked EJD and other PICs	0	0	2	1	0	0	3	3	1	0	0	0	0	**10**
Links between IM linked EJD and other PICs	4	4	0	6	6	7	3	4	5	8	8	7	7	**69**
Indirect Resulting Considerations	*18*	*16*	*2*	*47*	*30*	*60*	*15*	*32*	*16*	*56*	*66*	*37*	*55*	***450***
Total Resulting Considerations	**21**	**23**	**8**	**51**	**36**	**63**	**24**	**33**	**17**	**58**	**66**	**38**	**55**	**493**
Links on Segment	**28**	**27**	**17**	**72**	**49**	**92**	**33**	**47**	**32**	**92**	**104**	**66**	**83**	**742**
Total Second-Degree Links	**99**	**0**	**60**	**126**	**33**	**100**	**27**	**50**	**174**	**408**	**329**	**389**	**246**	**2041**
Total Links	**127**	**27**	**77**	**198**	**82**	**192**	**60**	**97**	**206**	**500**	**433**	**455**	**329**	**2783**

The total links to the second-degree that are to be considered for each segment ranges from 27 to 500. Note that the second-degree links are to be found by consulting the linked segments. The links that need to be shown on each of the 13 segments (1st-degree links and resulting considerations) thus ranges from 17 to 104, which although extensive, is comprehensible.

14.2.2) How the ILM Segments are Derived

Each ILM Segment was derived by considering all the nodes that are linked to the various PICs, the direct and the indirect links, in the following manner:

- Direct first-degree links (all the primary links pointing towards the focus PIC) are found by considering the various link models to find the PICs, FIMs, IMs, and EJD that are directly linked to the focus PIC. Link Models PIC↔PIC, FIM→PIC, IM→PIC, and EJD→PIC are thus considered.

- Indirect first-degree links (links affecting something affecting the focus PIC) are found by looking for EJD that affect the IMs linked to the focus PIC. Link Model EJD→IM is thus considered for IMs affecting the focus PIC.
- Direct resulting considerations (the PICs affected by the focus PIC) are found by considering Link Model PIC↔PIC.
- Indirect resulting considerations (PICs affected by IMs, FIMs, or EJDs linked to the focus PIC) are found by looking for PICs linked to IMs, FIMs, or EJDs linked to the focus PIC. Link Models IM→PIC, FIM→PIC, and EJD→PIC are thus considered for IMs, FIMs, and EJDs linked to the focus PIC.
- Second-degree links are found by considering the links to PICs linked to the focus PIC as discussed above. They are not indicated on the ILM Segments.

14.2.3) How the ILM Segments are Used

This subsection provides a short overview of what can be discerned by looking at an ILM Segment. A more detailed demonstration of how the ILM can be used is found in the demonstration phase (Chapter 17):

- Chapter 17.3 (Appendix F.1):
  - 1C – How the ILM Segments can be used to gauge the considerations surrounding a focus PIC, identify opportunities for improvement, and understand how IMs might interact with the focus PIC.
  - 1D2 – How the ILM Segments can be consulted for ways that a specific PIC can be improved.
  - 1D3 – How the ILM Segments can be used to consider what the pros and cons of altering a specify PIC are.
- Chapter 17.4 (Appendix F.2):
  - 2B – How the ILM Segments can be used to conduct an in-depth analysis of a specific PIC.
  - 2C1 – How the ILM Segments can be used to determine opportunities for improvement for a specific PIC.

This short overview considers ILM Segment 8 which focuses on Perceived Competence (refer to Figure 14-9). The ILM Segments show nodes connected to a focus PIC, as well as other nodes connected to the nodes connected to the focus PIC. When Figure 14-9 is observed:

- The first thing a user should note is the various PICs, FIMs, IMs, and EJDs directly linked to Perceived Competence:
  - It is seen that Job Complexity and Autonomy have an effect on Perceived Competence, and that Intrinsic Motivation is affected by Perceived Competence.
  - Four EJDs can be used to affect Perceived Competence.
  - The IMs Efficiency Wages, Positive Feedback, and Promotions are linked to Perceived Competence.
  - The FIMs, Performance Requirements and Reward Type have some effect on Perceived Competence.
- A user should also note that certain PICs are affected by the IMs, EJDs, and FIMs linked to Perceived Competence. These are shown on the bottom left of ILM Segment 8, and top middle.

- On the bottom right a user can note any EJD that can be used to improve IMs that are related to Perceived Competence.

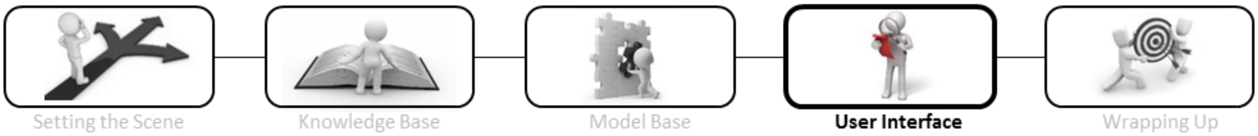
The information above can be used by a user in various ways. If the user is looking for ways to improve Perceived Competence the user can:

- Look for blue lines (positive links) with Perceived Competence:
  - Autonomy might be used to improve Perceived Competence.
  - The IMs Efficiency Wages and Positive Feedback might be used to improve Perceived Competence.
  - Providing the right Reward Type, as per FIM3, might improve Perceived Competence.
- Look for ways the EJD can be used to improve Perceived Competence:
  - Directly with the four EJDs to centre.
  - Indirectly with the two EJDs right bottom by improving any IMs linked to Perceived Competence.
- Look for red lines (negative links) with Perceived Competence for mitigation:
  - Make sure Job Complexity does not harm Perceived Competence.
  - Consider the Performance Requirements as per FIM2.
  - See if the Promotions Practices, as per IM7, are harming Perceived Competence.

14.3) The ILM Segments

This subsection contains the Integrated Links Model segments.

This section contains the 13 segments that make up the Integrated Links Model (ILM). The sections are represented as standardised visual models. The visual models provide the direct and indirect first-degree links to the focus PIC, as well as resulting considerations stemming from the relevant Elements of Job Design (EJD), Incentive Mechanisms (IMs), and Features of Incentive Mechanisms (FIMs). Second-degree links can be found by consulting the linked segments. The links between the IMs and FIMs are not depicted. The visual models contain the name or reference number for each node and link. In some cases the resulting consideration links are too numerous to label, the relevant link models must be consulted in such instances. Refer to Figure 14-2 through Figure 14-14:



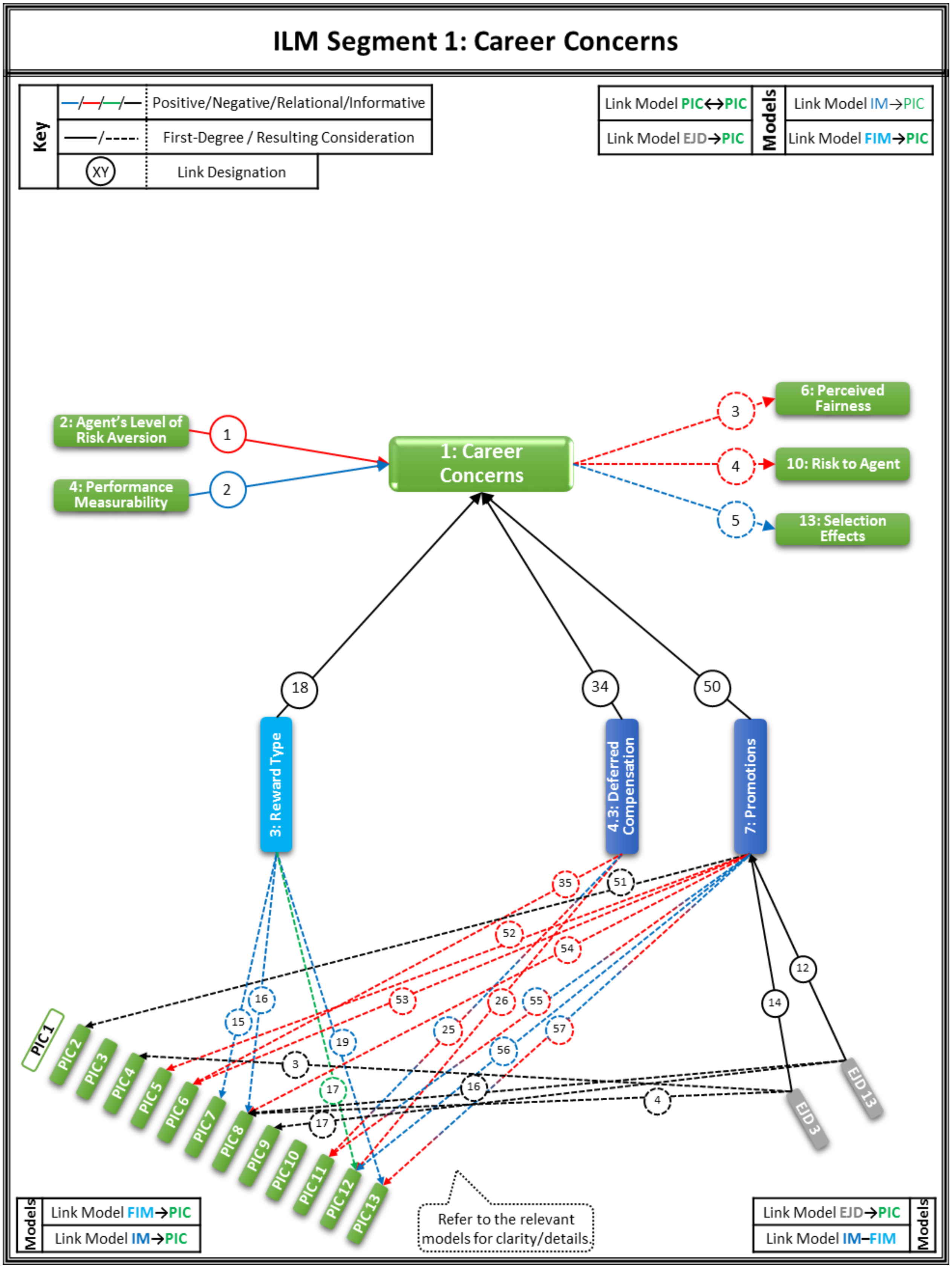


Figure 14-2: Integrated Links Model (ILM) Segment 1: Career Concerns

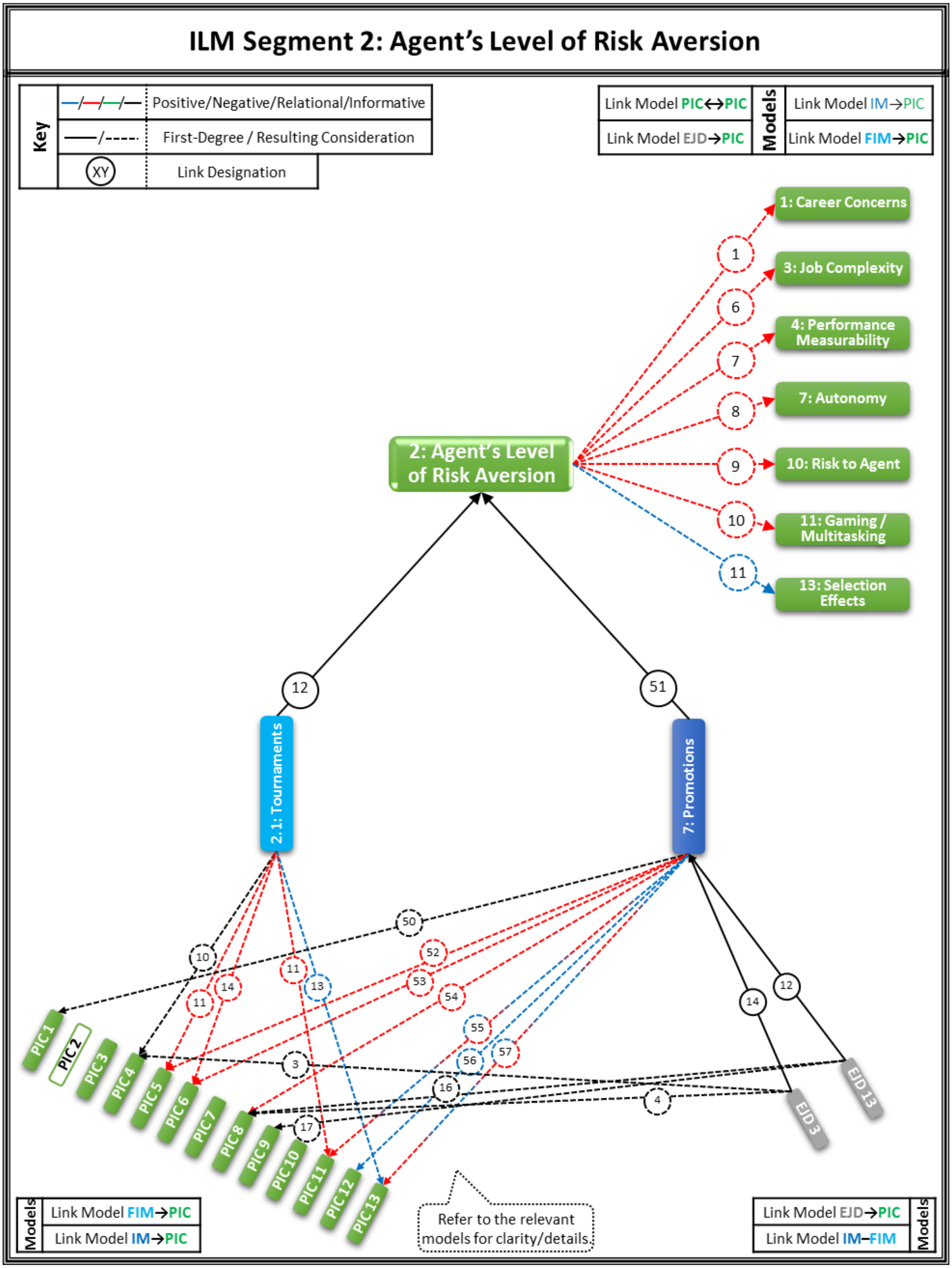
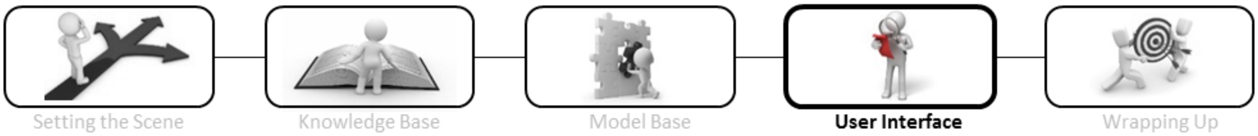


Figure 14-3: Integrated Links Model (ILM) Segment 2: Agent's Level of Risk Aversion



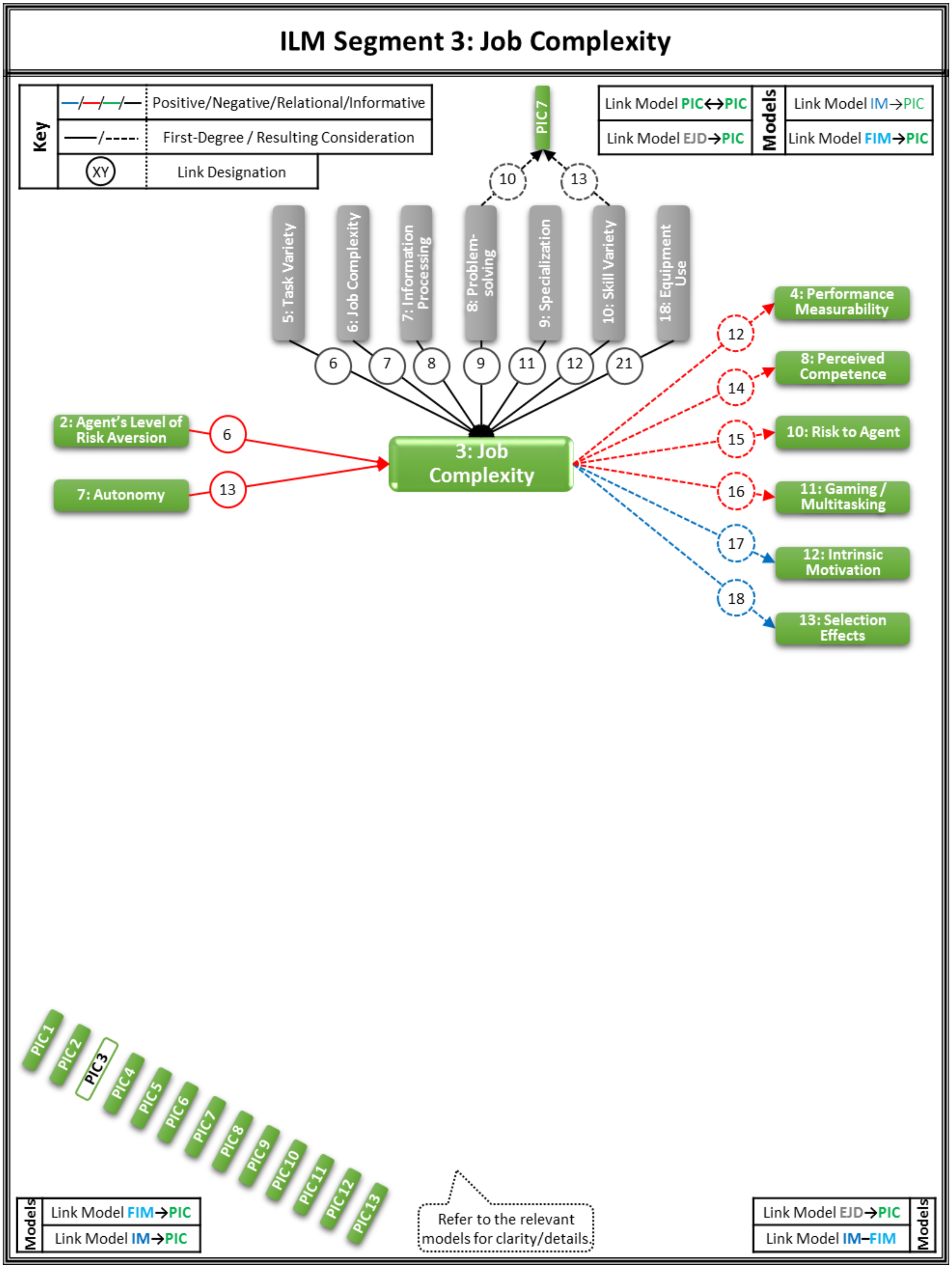
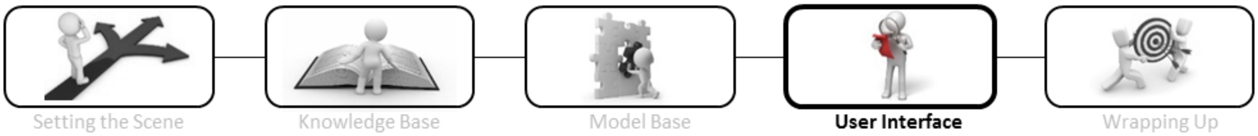


Figure 14-4: Integrated Links Model (ILM) Segment 3: Job Complexity



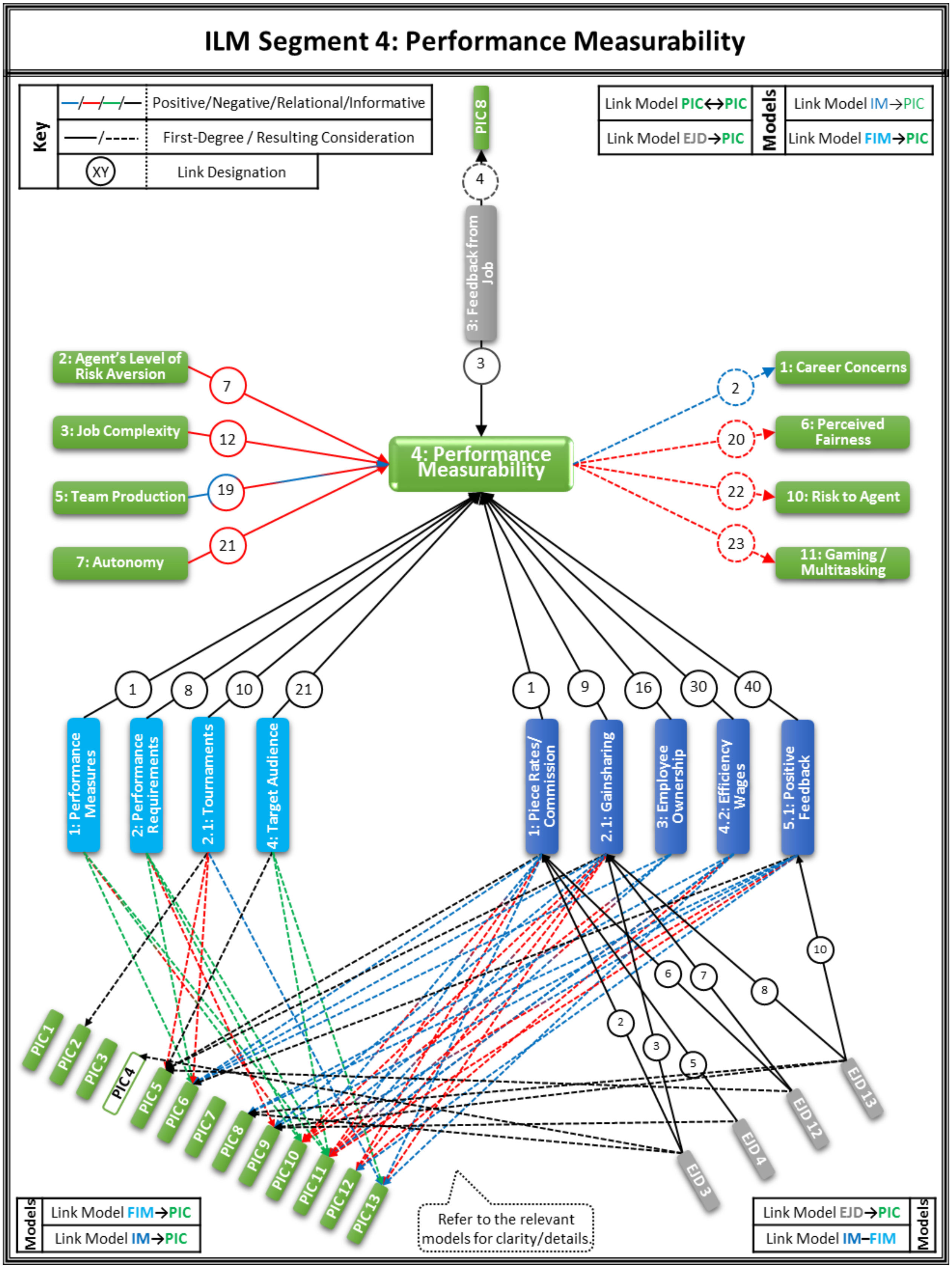


Figure 14-5: Integrated Links Model (ILM) Segment 4: Performance Measurability

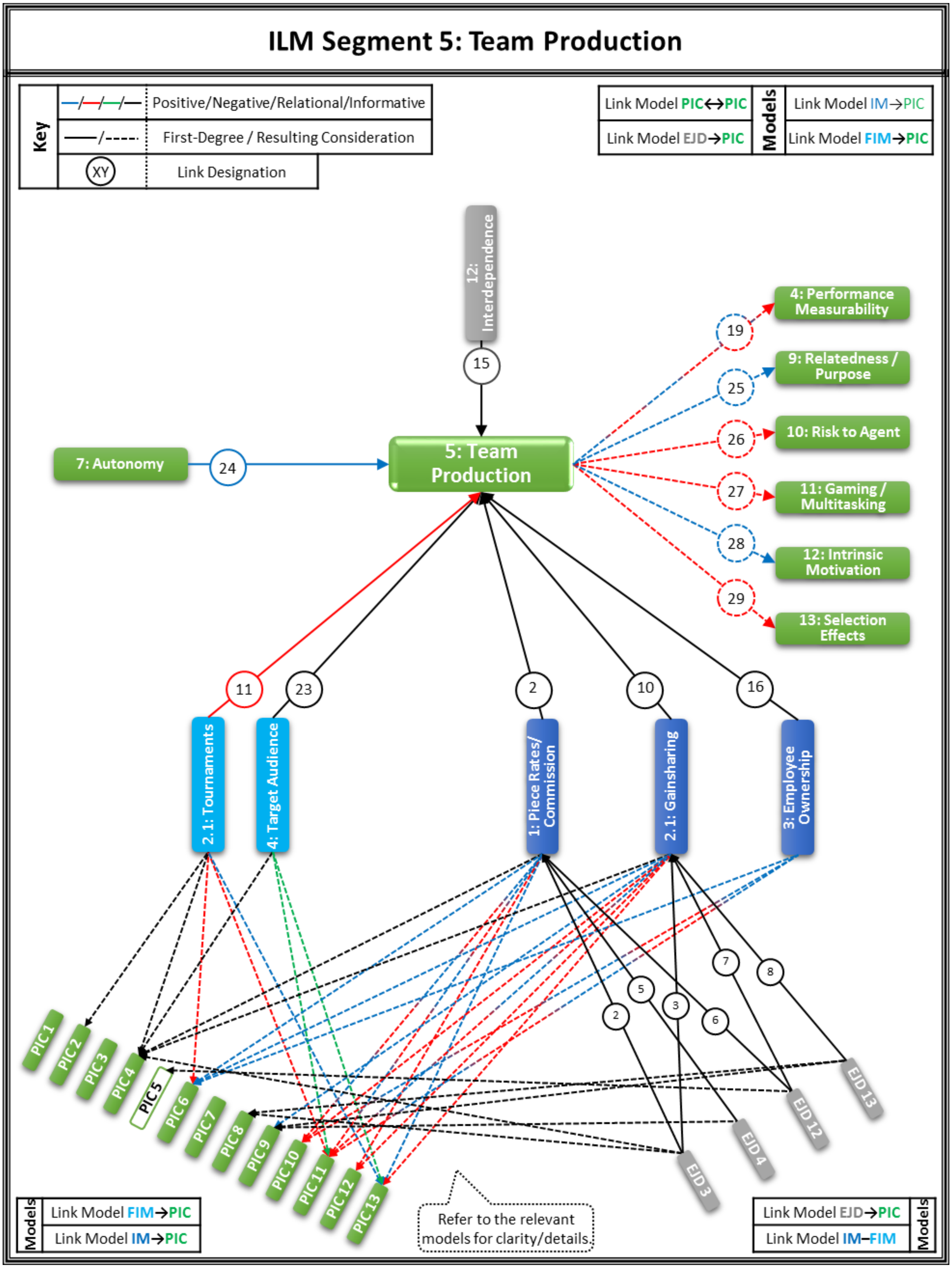


Figure 14-6: Integrated Links Model (ILM) Segment 5: Team Production

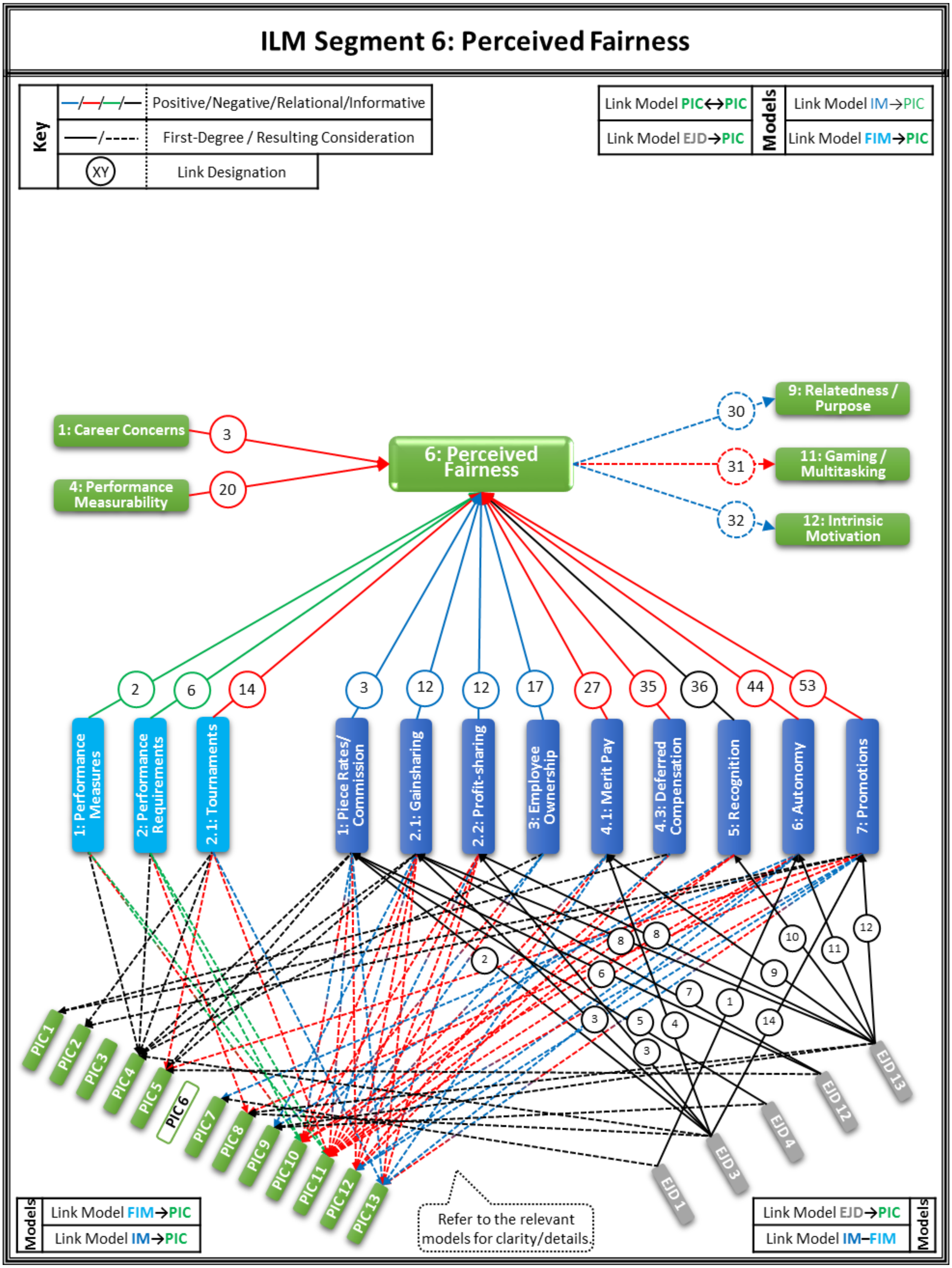


Figure 14-7: Integrated Links Model (ILM) Segment 6: Perceived Fairness

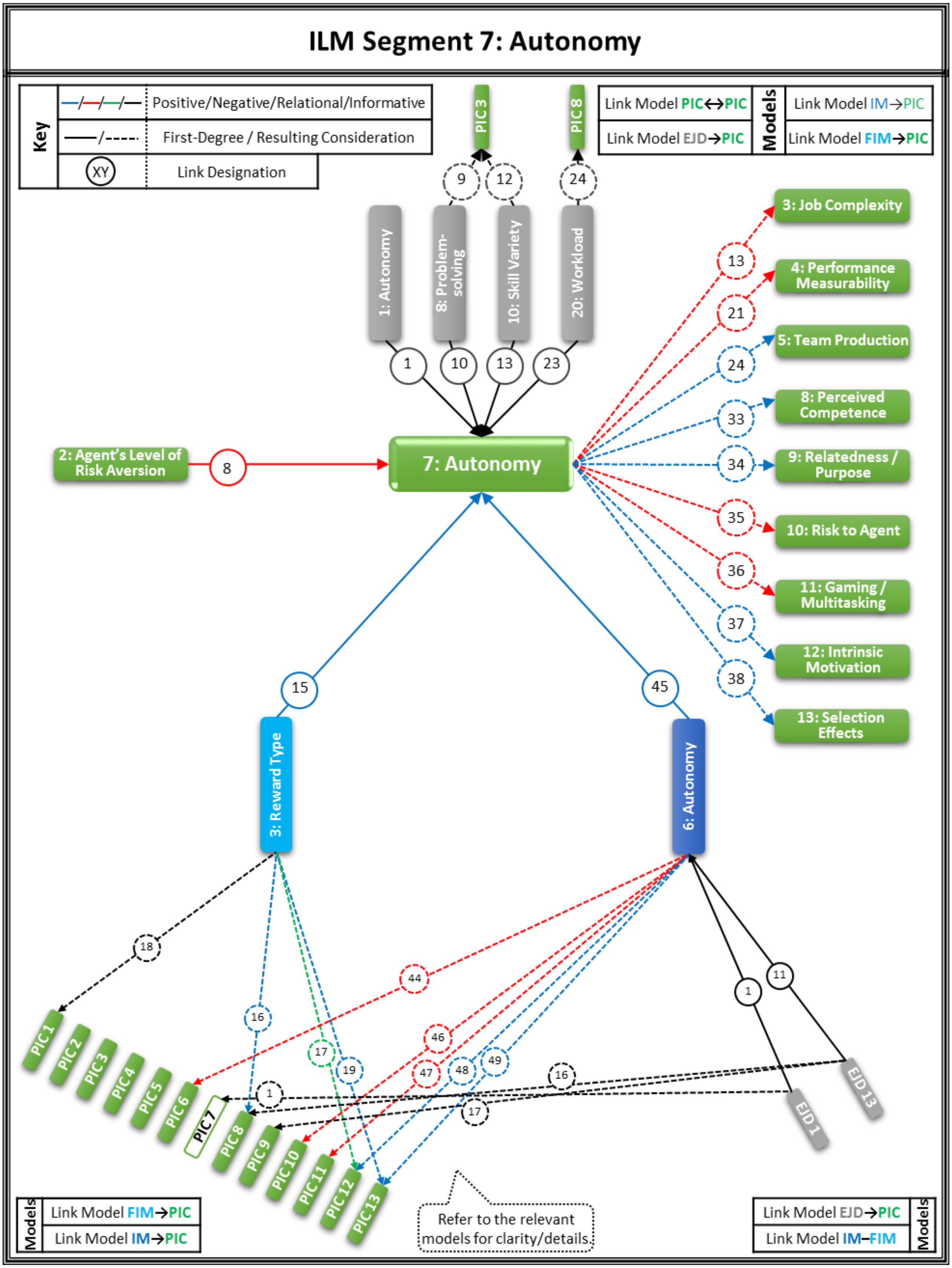


Figure 14-8: Integrated Links Model (ILM) Segment 7: Autonomy

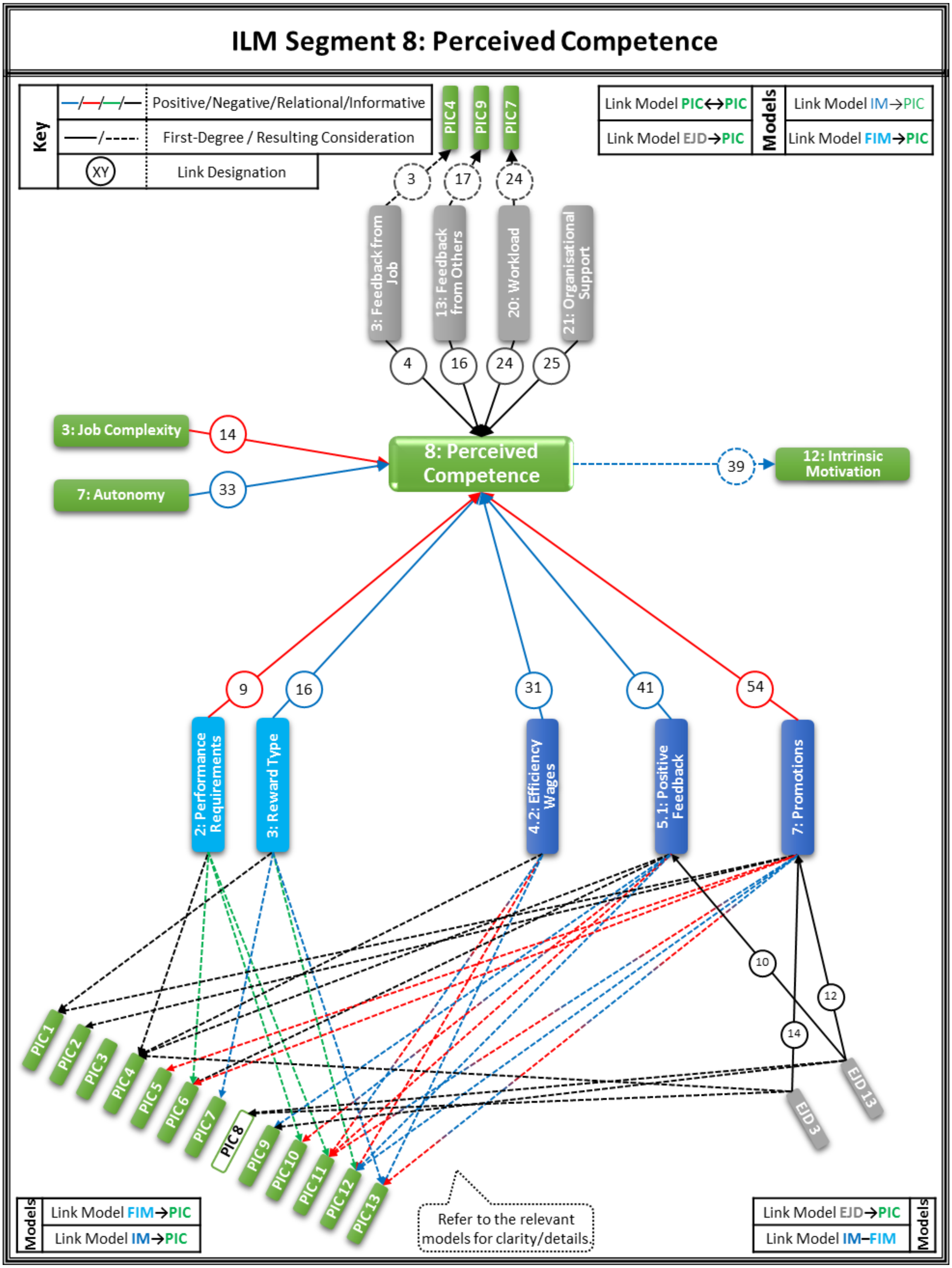


Figure 14-9: Integrated Links Model (ILM) Segment 8: Perceived Competence

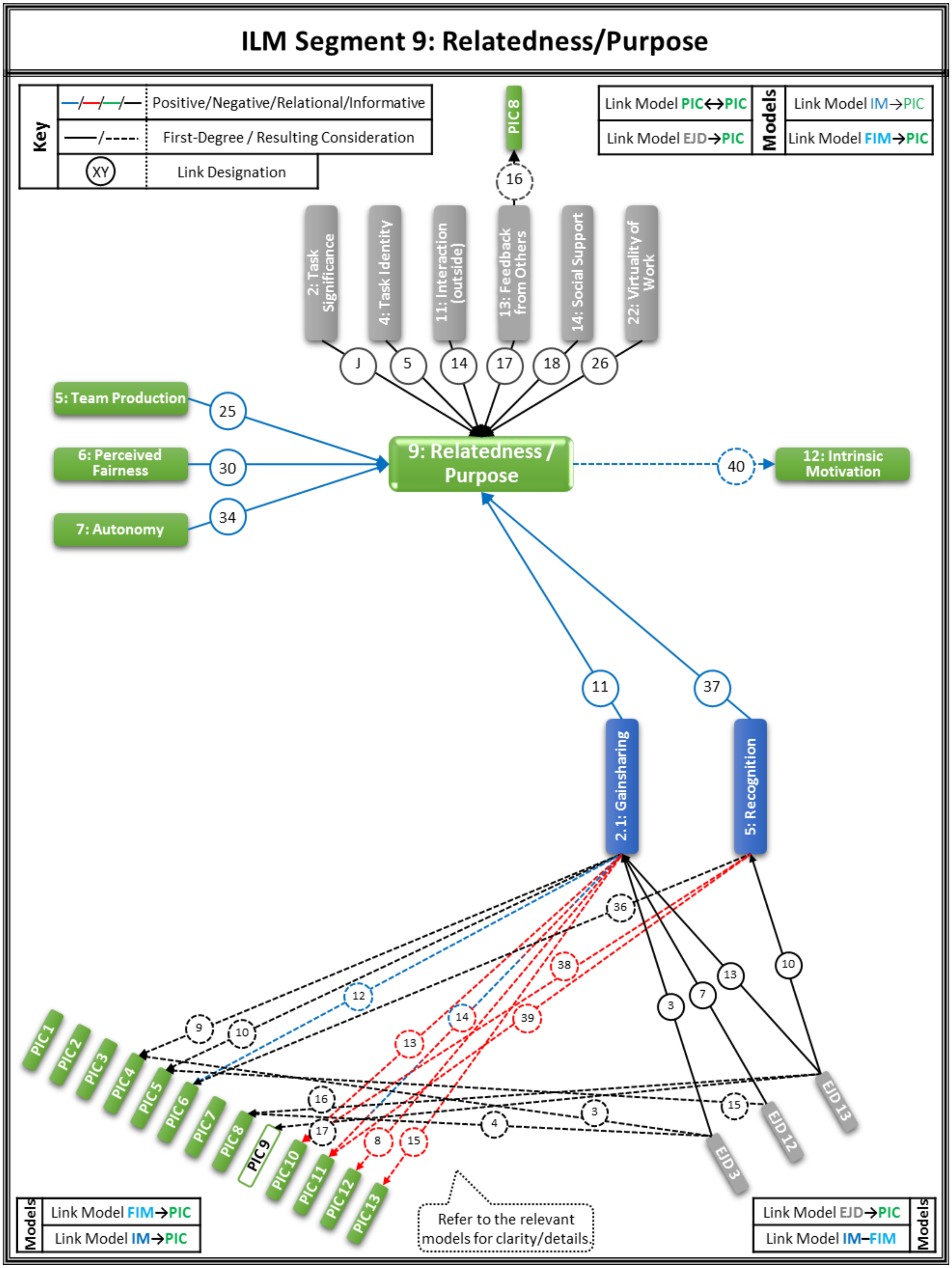


Figure 14-10: Integrated Links Model (ILM) Segment 9: Relatedness/Purpose

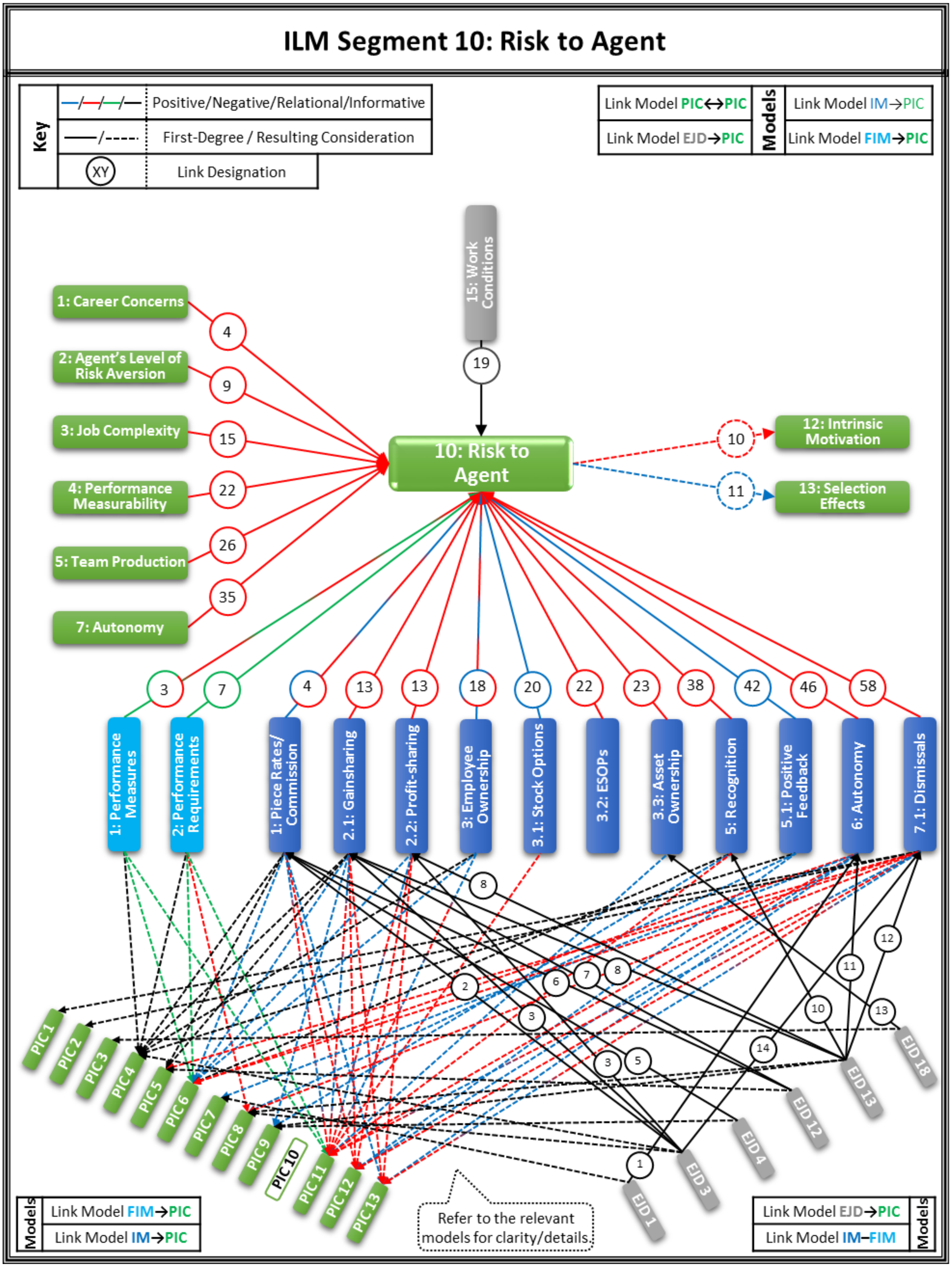
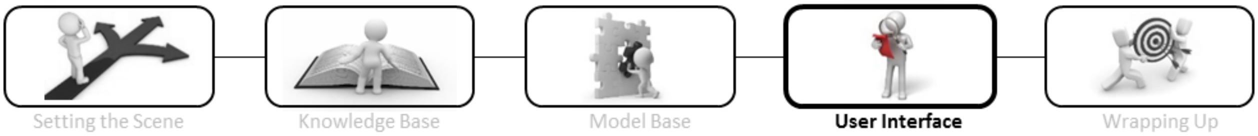


Figure 14-11: Integrated Links Model (ILM) Segment 10: Risk to Agent



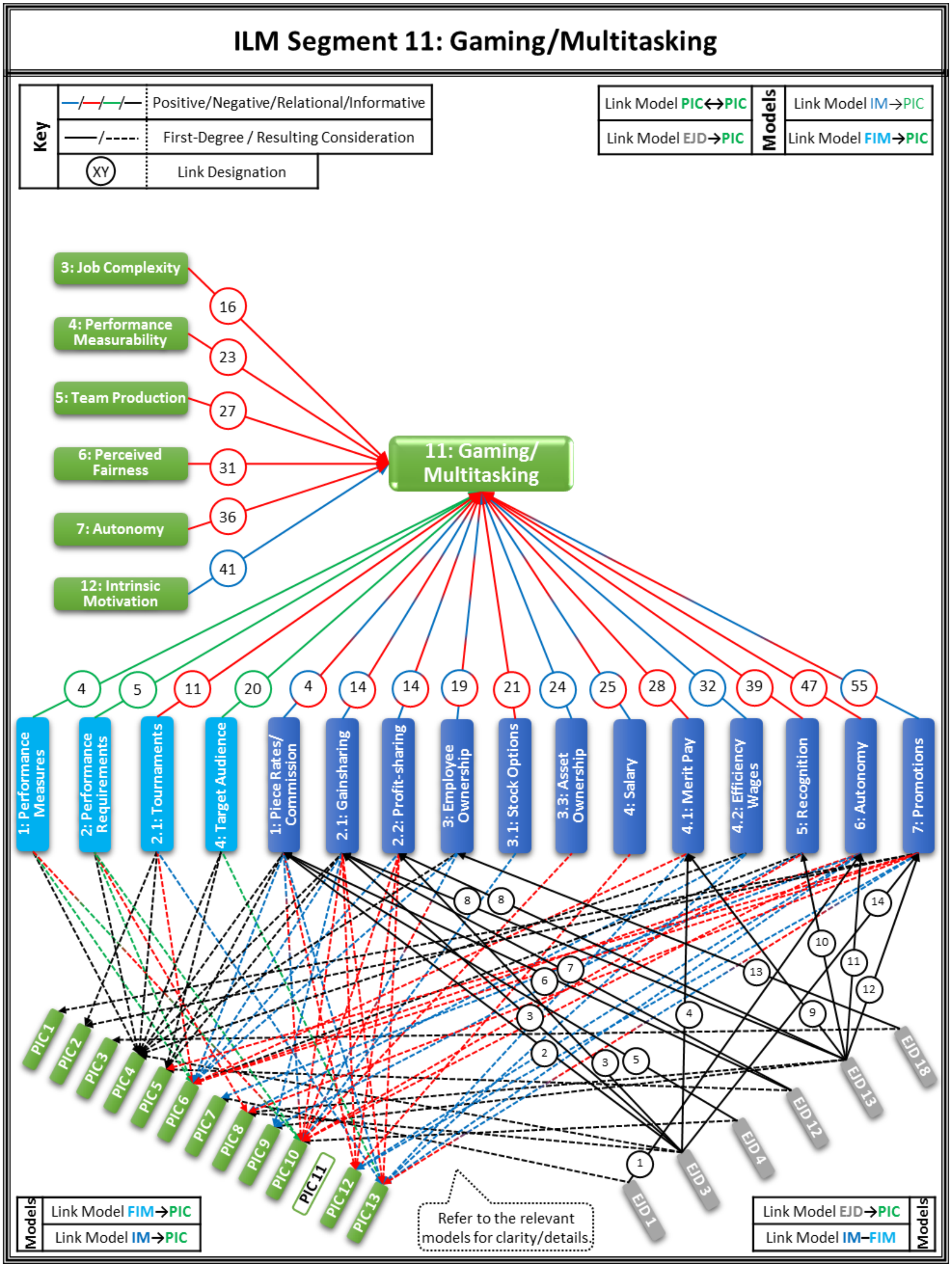


Figure 14-12: Integrated Links Model (ILM) Segment 11: Gaming/Multitasking

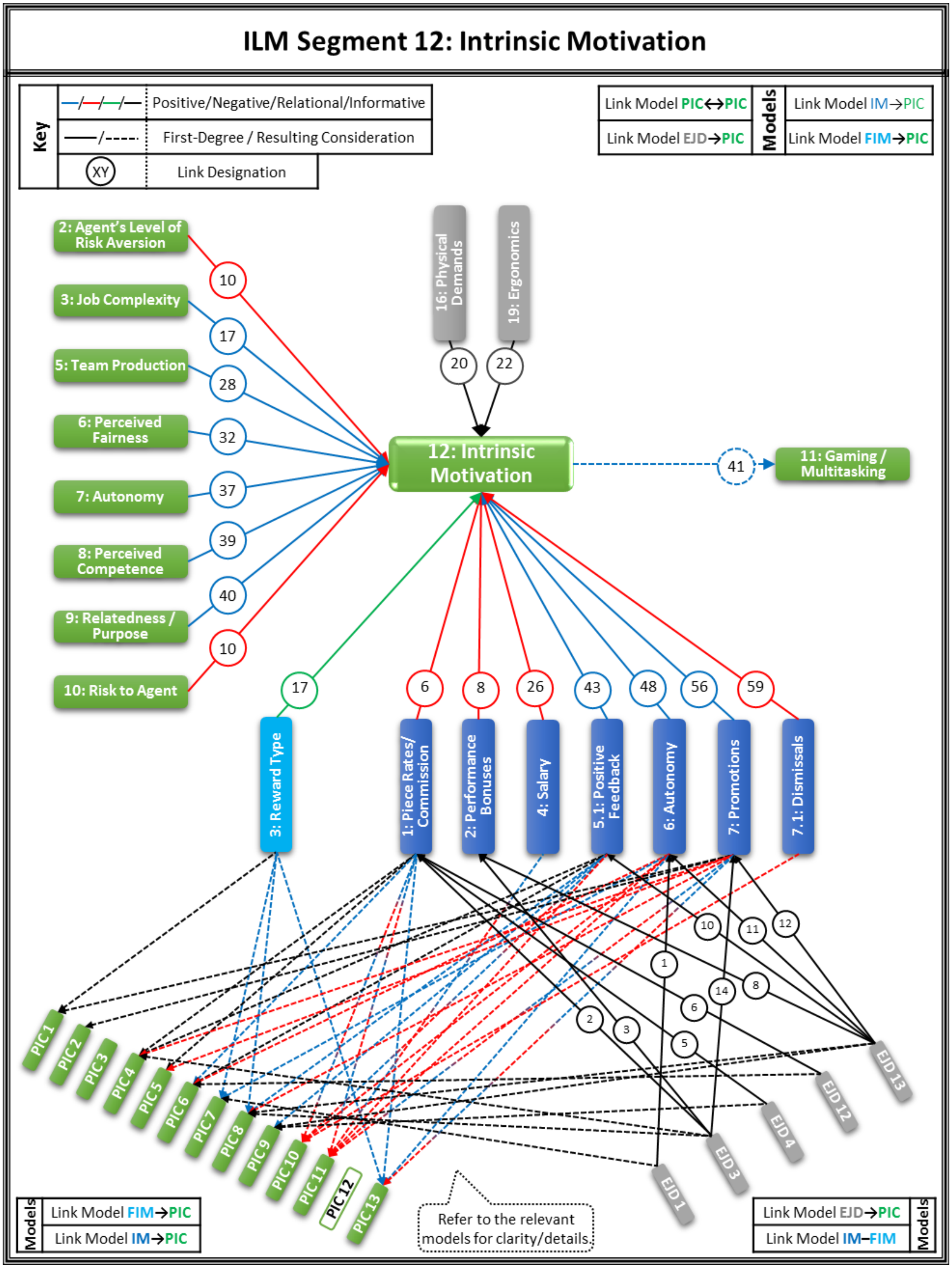


Figure 14-13: Integrated Links Model (ILM) Segment 12: Intrinsic Motivation

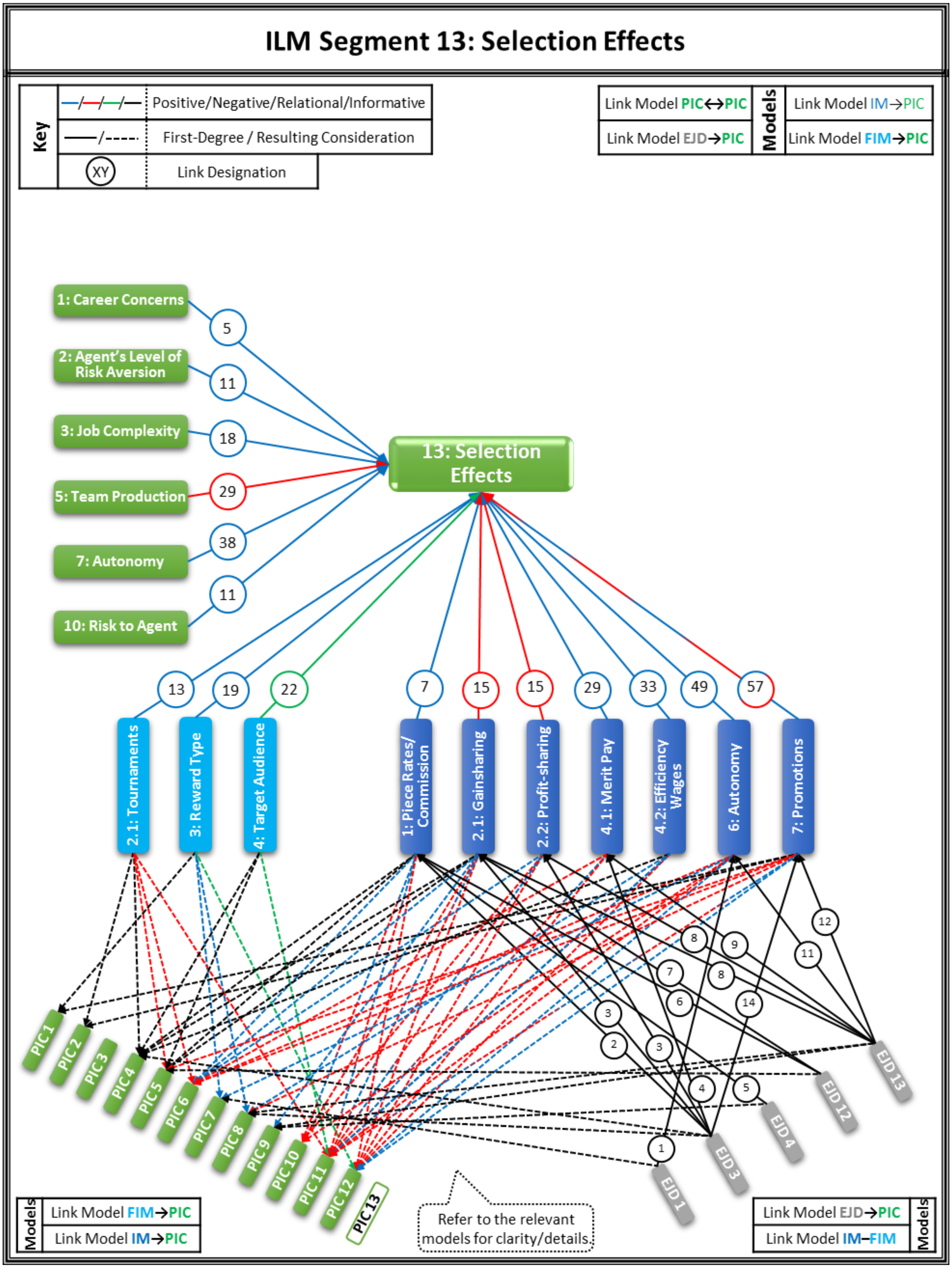


Figure 14-14: Integrated Links Model (ILM) Segment 13: Selection Effects

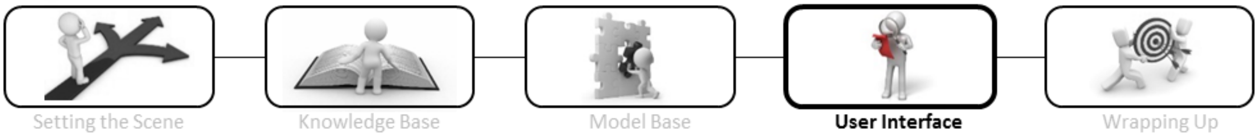
14.4) Summary

This subsection concludes Chapter 14: The Integrated Links Model.

The 13 Integrated Links Model (ILM) Segments illustrate what one would see when all the links connected to a specific PIC across the various link models are shown. The links that are shown on each of the 13 segments (1st-degree links and resulting considerations) range from 17 to 104. Although these are extensive, they are comprehensible.

The ILM can be used to quickly discern:

- which PICs affect a certain PIC;
- which PICs are affected by a certain PIC;
- which IMs can be used to affect a certain PIC;
- which EJD can be used to affect a certain PIC (both directly and through the IMs);
- which other PICs are affected by IMs or EJD linked to a certain PIC;
- opportunities to improve a certain PIC;
- threats or dangers to a certain PIC.



Chapter 15: The Cascading Effects Models (CEMs)

"Modest doubt is called the beacon of the wise."

-William Shakespeare

15.1) Introduction

This subsection introduces Chapter 15: The Cascading Effects Models.

The Cascading Effects Models (CEMs) are a collection of 17 models, each focusing on a specific type or subtype of Incentive Mechanism (IM). Each CEM illustrates what one would see when all the links connected to a specific IM across the various link models are shown.

Chapter 15 introduces the CEMs and gives an overview of what they entail. The CEMs are constructed and provided accordingly. This chapter is structured as follows:

- Chapter 15.1) Introduction
- Chapter 15.2) Overview of the CEMs
  - The Cascading Effects Models are introduced and an overview of what they entail is provided.
- Chapter 15.3) The Cascading Effects Models (CEMs)
  - The Cascading Effects Models are provided.
- Chapter 15.4) Summary

15.2) Overview of the Cascading Effects Models (CEM)

This subsection introduces the Cascading Effects Models and provides an overview of what they entail.

15.2.1) Introduction and Overview

The Integrated Links Model (ILM) shows users what Incentive Mechanisms (IMs) or Elements of Job Design (EJD) influence a certain PIC. When users decide to use or modify an IM to effect some change, they need to be aware of the other PICs that will be affected by this decision. While the information is available in the various link models, the User Interface (UI) can further improve a user's decision-making ability by providing the user with all the relevant considerations from the various models in one place. This helps users to understand the situation and improves the speed at which they can make decisions. This overview is provided for each IM in the Cascading Effects Models (CEMs). While both the EJD and IM can be used to influence a PIC, CEMs will only be provided for the IMs. The EJD have relatively few links which can easily be found in the EJD→PIC Links and EJD→IM Links models.

15.2.2) How the CEMs are Derived

Each CEM was derived by considering all the nodes that are aligned to the various IMs in the following manner:

- Link Model IM→PIC was used to find the PICs that can be influenced by the focus IM (red and blue lines). These go to the right of the focus IM on the CEMs.
- Link Model IM→PIC was also used to find the PICs that inform the suitability of the focus IM (black lines). These go to the top of the focus IM under 'informative links'.
- Link Model EJD→IM was used to find EJD that can be used to influence the focus IM. These go to the top of the focus IM under 'informative links'.
- Link Model IM–FIM was used to find the focus IM's links with the Features of Incentive Mechanisms (FIMs). These go below the focus IM under 'descriptive links'.

15.2.3) How the CEMs are Used

The 17 CEMs place the focus individually on each of the IMs. Each CEM shows the positive and negative influences or links that the focus IM has on PICs (only 1^{st}-degree, the ILM or Link Model PIC↔PIC can be used to find 2^{nd}-degree). This provides the user with something similar to a SWOT analysis, the strengths and weaknesses, or threats and opportunities, associated with each IM are highlighted. A distinction is made between specific or characteristic links and generic links (generic links highlight a typical effect due to the IM's FIMs). The CEMs further describe an IM in terms of FIMs, notes when it is typically used in relation to PICs, and highlights any EJD that can be used to improve its use. A visual illustration of the form of the CEMs is shown in Figure 15-1:

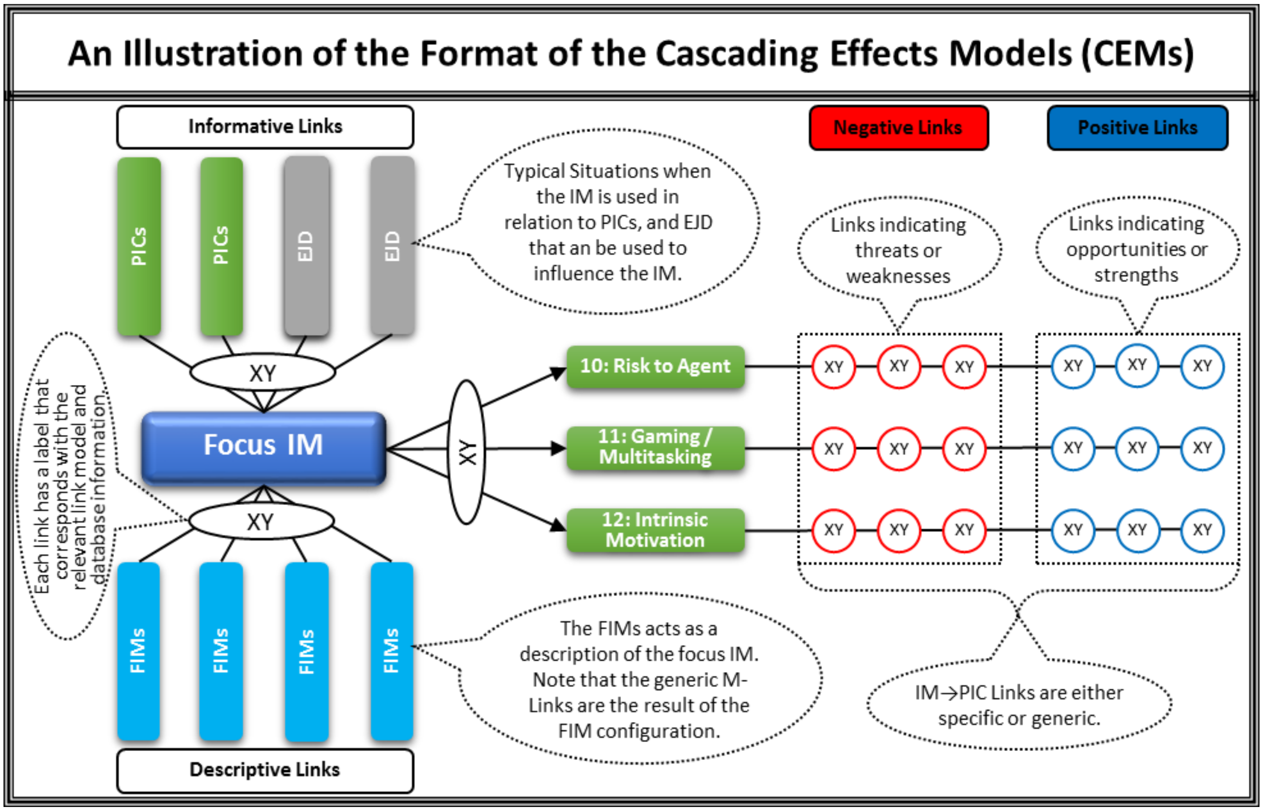


Figure 15-1: An Illustration of the Format of the Cascading Effects Model

Each model is accompanied by a short synopsis and SWOT analysis as per the links on the CEM. Recall that the DSS seeks to improve decision-making by improving both the quality and speed of decision-making. The UI further improves the speed of decision-making by helping unfamiliar users to understand the situation, through providing the short synopsis and SWOT analysis, without having to consult the various links and nodes separately.

15.3) The Cascading Effects Models (CEM)

This subsection contains the CEMs.

This subsection contains the 17 Cascading Effects Models (CEMs) accompanied by a short synopsis and SWOT analysis. The CEMs are represented as standardised visual models. The visual models show the first-degree positive and negative effects of the Incentive Mechanism (IM) in question on the PICs, as well as the IM's Features of Incentive Mechanisms (FIMs), Elements of Job Design (EJD) that can be used to improve the IM, and when the IM is typically used in relation to PICs. Second-degree links can be found by consulting the Integrated Links Model (ILM) or Link Model PIC↔PIC. The visual models contain the name or designation for each node and link. Refer to Figure 15-2 through Figure 15-18:

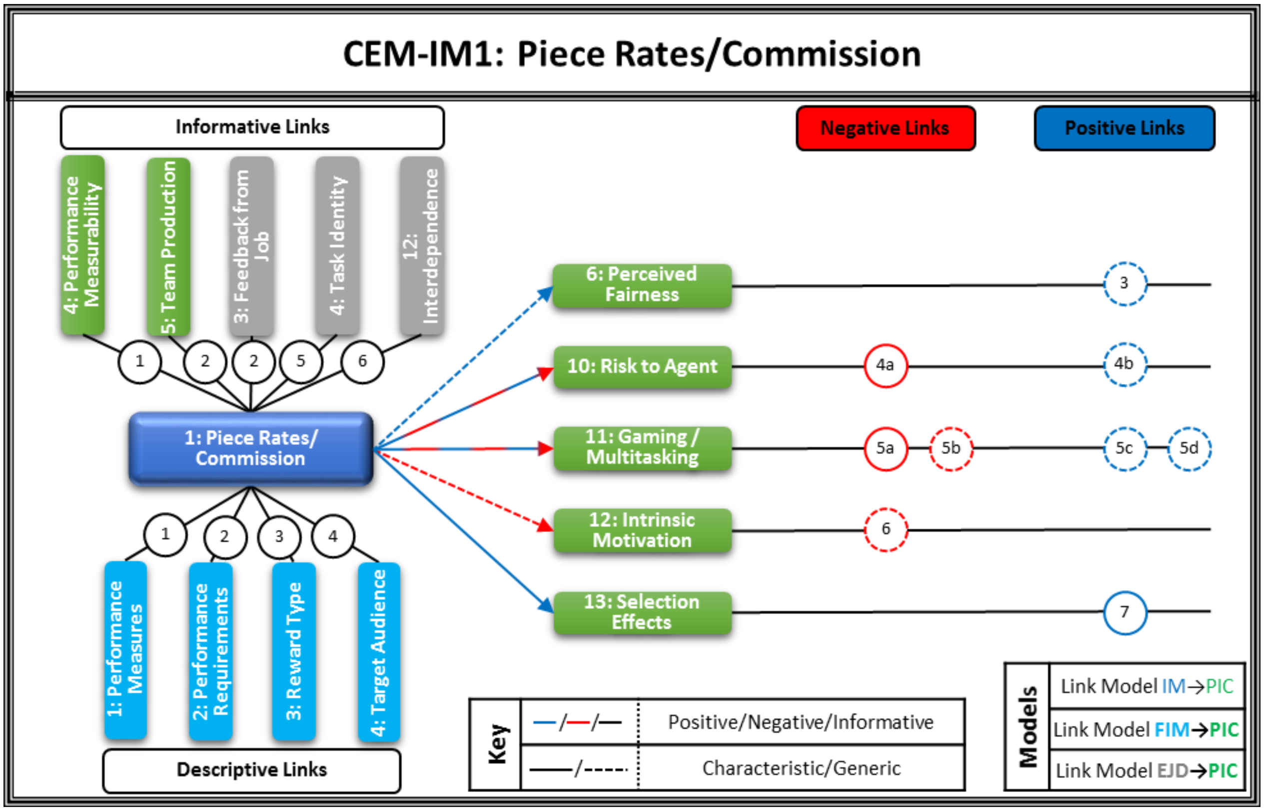


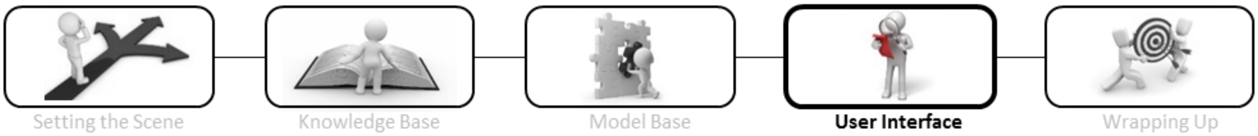
Figure 15-2: CEM-IM1: Piece Rates/Commission

Synopsis:

Piece Rates incentivises employees by paying (IM–FIM3) individuals (IM–FIM4) for work that is based on a fixed rate (IM–FIM2) according to a physical measurement of units produced or actions performed (IM–FIM1). Piece Rates are typically used in 'simple' jobs where individual performance is easy to measure (IM→PIC1), and teamwork is not crucial (IM→PIC2). The EJD Feedback from Job (EJD→IM2), Task Identity (EJD→IM5), and Interdependence (EJD→IM6) can be used to improve the effectiveness of Piece Rates.

Basic SWOT:

- Characteristically – Piece Rates tend to attract more-able employees (IM→PIC7), but expose employees to risks (IM→PIC4a), and are vulnerable to various forms of gaming (IM→PIC5a).
- Generally – Piece Rates have a positive effect on Perceived Fairness as they use objective performance measures with linear performance requirements (IM→PIC3 as per FIM→PIC2 and FIM→PIC6). The linear performance measures also have a positive effect on Piece Rates' risk characteristics (IM→PIC4b as per FIM→PIC7) and make gaming more difficult (IM→PIC5c as per FIM→PIC5). As Piece Rates use individual incentives they has a negative effect on cooperation (IM→PIC5b as per FIM→PIC20c) but do not suffer from the free-rider problem (IM→PIC5d as per FIM→PIC20a). Piece Rates also have a negative effect on Intrinsic Motivation as they make use of tangible rewards (IM→PIC6 as per FIM→PIC17).



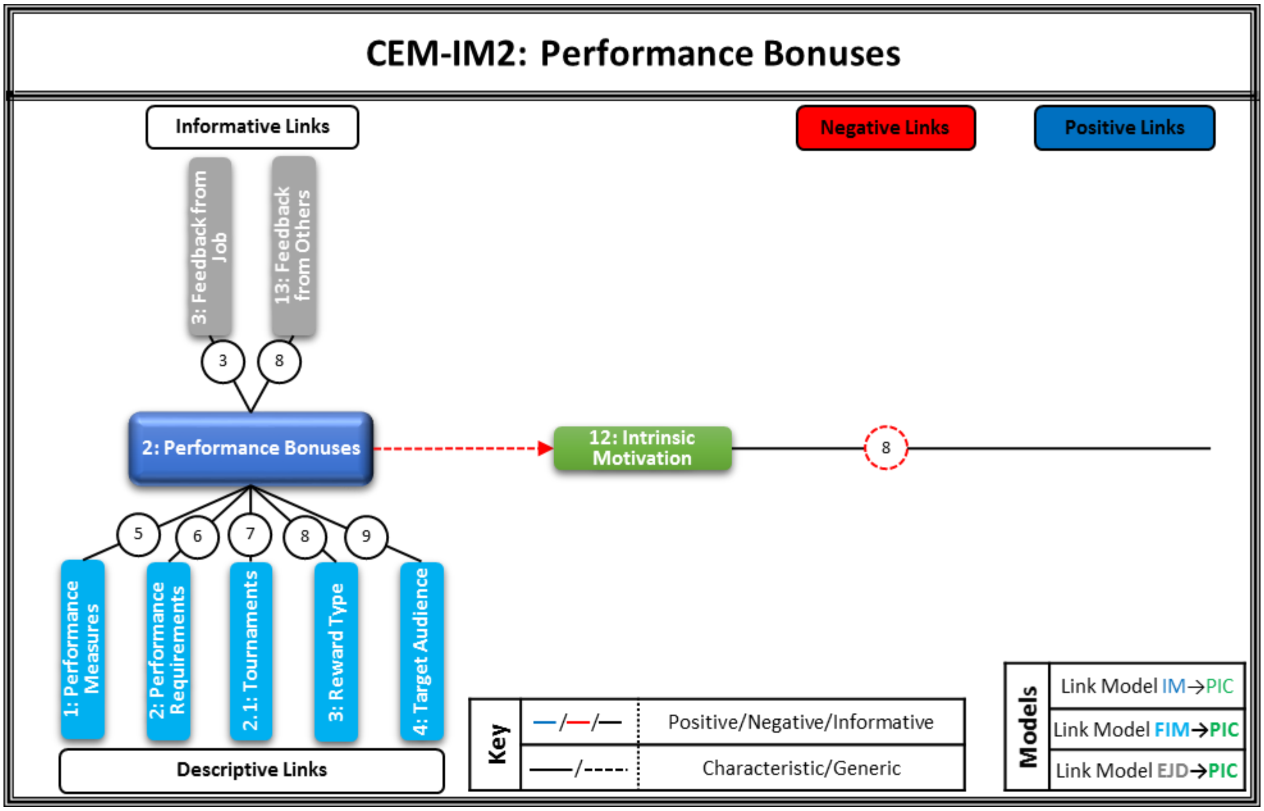


Figure 15-3: CEM-IM2: Performance Bonuses

Synopsis:

Performance Bonuses incentivise employees with a once-off bonus in addition to base pay (IM–FIM8), based on an assessment of performance. The performance measures, performance requirements and the target audience can vary (IM–FIM5, 6, and 9). Tournaments are however not typically used (IM–FIM7). The EJD Feedback from Job (EJD→IM3) and Feedback from Others (EJD→IM8) can be used to improve the effectiveness of Performance Bonuses.

Basic SWOT:

As Performance Bonuses vary greatly, the FIMs have to be specified for a specific plan before a meaningful SWOT analysis can be completed. Once the FIMs of the specific plan are selected the FIM→PIC links can be used to ascertain the positive and negative links.

- Generally – Performance Bonuses have a negative effect on Intrinsic Motivation as they typically use tangible rewards as extrinsic motivators (IM→PIC8).

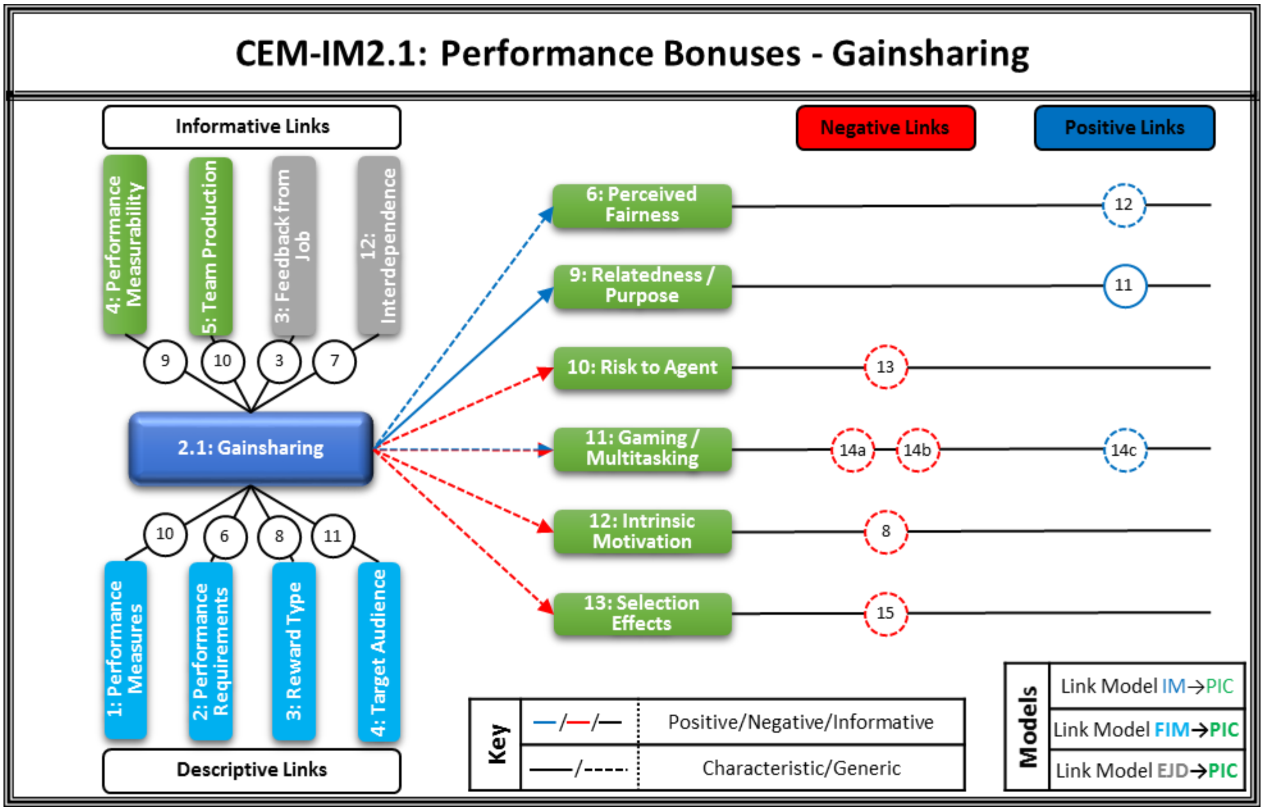


Figure 15-4: CEM-IM2.1: Performance Bonuses – Gainsharing

Synopsis:

Gainsharing incentivises employees with a Performance Bonus (IM–FIM6) based on group or unit performance (IM–FIM11) where employees share financially (IM–FIM8) in the gain or improvement (IM–FIM10). Gainsharing is only suitable when the team or group's performance is easy to measure (IM→PIC9) and is well suited to a Team Production setting (IM→PIC10). The EJD Feedback from Job (EJD→IM3) and Interdependence (EJD→IM7) can be used to improve the effectiveness of Gainsharing.

Basic SWOT:

- Characteristically – Gainsharing can stimulate an employee's sense of Relatedness/Purpose (IM→PIC11).
- Generally – Gainsharing has a negative effect on Intrinsic Motivation as it typically uses tangible rewards as extrinsic motivators (IM→PIC8). As Gainsharing uses objective performance measures it has a positive effect on Perceived Fairness (IM→PIC12 as per FIM→PIC2), but exposes employees to risks (IM→PIC13 as per FIM→PIC3) and is more susceptible to gaming (IM→PIC14a as per FIM→PIC4). Gainsharing is not attractive to higher-performing employees as it is group-based (IM→PIC15 as per FIM→PIC22). Being group–based, Gainsharing is also subject to social loafing or free-riding (IM→PIC14b as per FIM→PIC20a), but has a positive effect on cooperation (IM→PIC14c as per FIM→PIC20c).

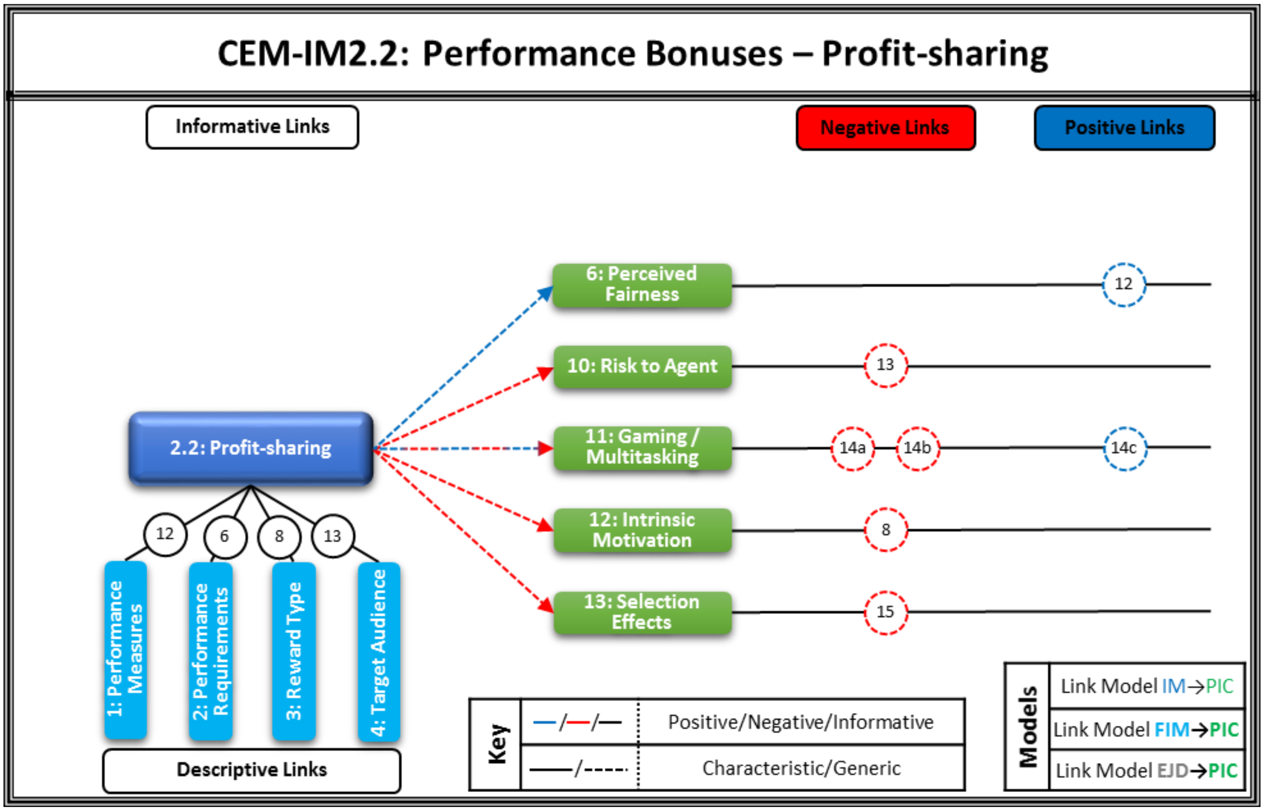


Figure 15-5: CEM-IM2.2: Performance Bonuses – Profit-sharing

Synopsis:

Profit-sharing incentivises employees with a Performance Bonus (IM–FIM6) where a portion of organisational profits (IM–FIM12) is shared (IM–FIM8) with employees (IM–FIM13).

Basic SWOT:

- Generally – Profit-sharing has a negative effect on Intrinsic Motivation as it typically uses tangible rewards as extrinsic motivators (IM→PIC8). As Profit-sharing uses objective performance measures it has a positive effect on Perceived Fairness (IM→PIC12 as per FIM→PIC2), but exposes employees to risks (IM→PIC13 as per FIM→PIC3), and is more susceptible to gaming (IM→PIC14a as per FIM→PIC4). Profit-sharing is not attractive to higher performing employees as it is group-based (IM→PIC15 as per FIM→PIC22). Being group-based Profit-sharing is also subject to social loafing (IM→PIC14b as per FIM→PIC20a), but has a positive effect on cooperation (IM→PIC14c as per FIM→PIC20c).

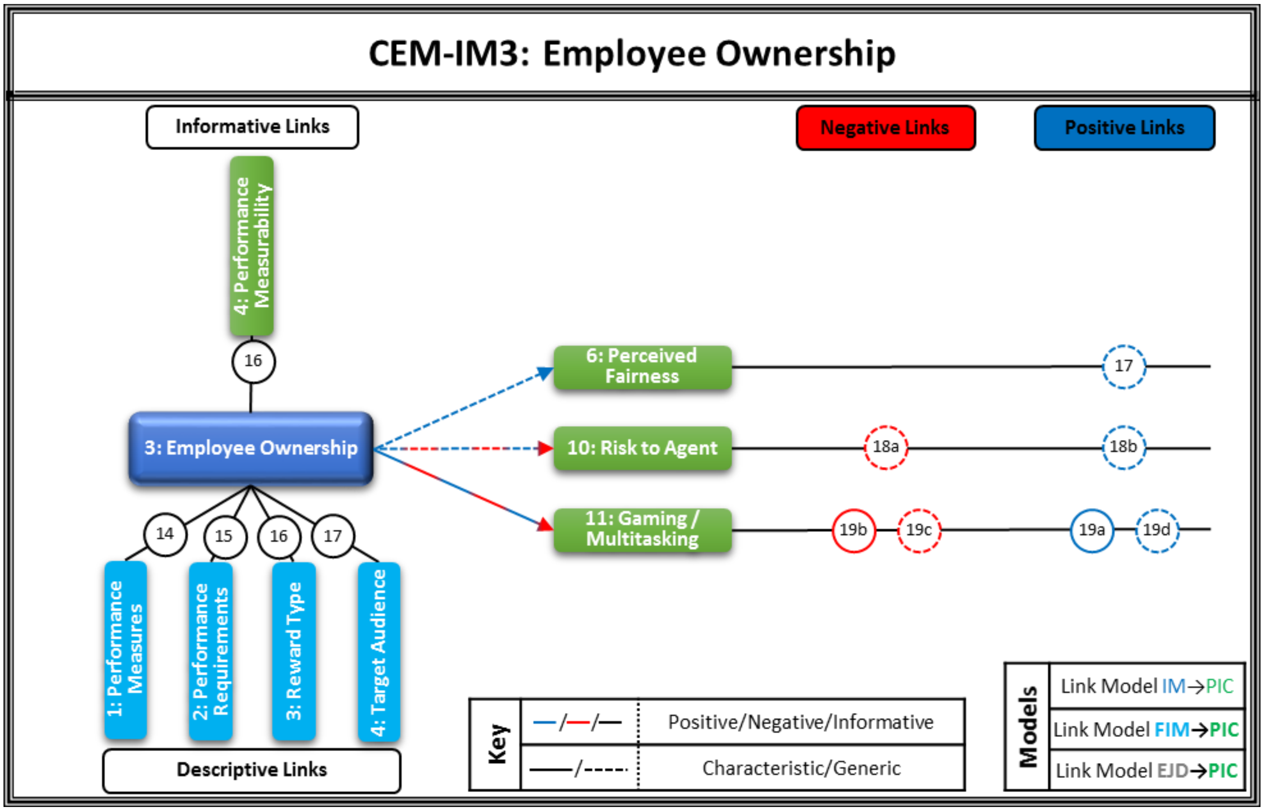


Figure 15-6: CEM-IM3: Employee Ownership

Synopsis:

Employee Ownership plans incentivise employees through the ownership of a company, directly or indirectly, in part or in whole, by some or all of its employees. These plans typically reward employees according to changes in stock prices, company value, or asset condition (IM–FIM14, 15, and 16). Employee Ownership plans can be applied to individuals, groups, or the organisation as a whole (IM–FIM17). They are typically found when information asymmetries are great and no good performance measures exist (IM→PIC16).

Basic SWOT:

- Characteristically – Employee Ownership plans can mitigate multitasking problems (IM→PIC19a) but are subject to the free-rider problem (IM→PIC19b as per FIM→PIC20).
- Generically – Employee Ownership plans have a positive effect on Perceived Fairness as they use objective performance measures with linear requirements (IM→PIC17 as per FIM→PIC2 and FIM→PIC6). Using objective performance measures, however, exposes employees to risks (IM→PIC18a as per FIM→PIC7) and makes the plans more susceptible to gaming (IM→PIC19c as per FIM→PIC4). On the other hand, using linear or simple performance requirements has favourable risk characteristics (IM→PIC18b as per FIM→PIC7) and makes gaming more difficult (IM→PIC19d as per FIM→PIC5).

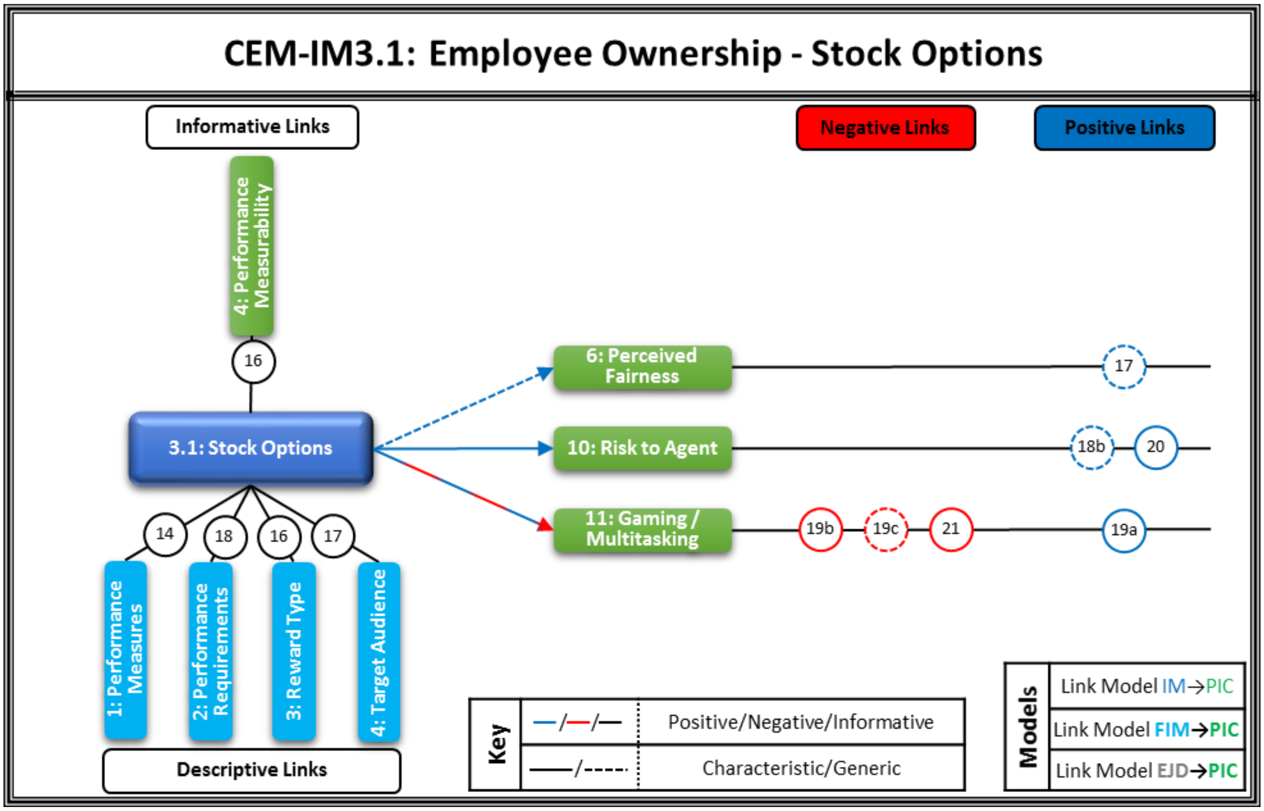


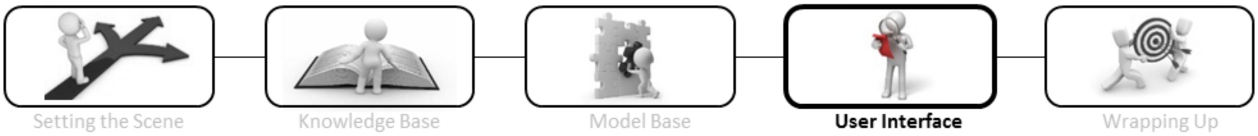
Figure 15-7: CEM-IM3.1: Employee Ownership – Stock Options

Synopsis:

Stock Options are Employee Ownership plans (IM–FIM14, 16, and 17) that give employees the opportunity to buy the company's stock at a previously fixed price (IM–FIM18). They are typically found when information asymmetries are great and no good performance measures exist (IM→PIC16).

Basic SWOT:

- Characteristically – Employee Stock Options typically pose no downside risk to employees Employee (IM→PIC20). They hence have no motivational effect in a down market (IM→PIC21). They can mitigate multitasking problems (IM→PIC19a) but are subject to the free-rider problem (IM→PIC19b as per FIM→PIC20).
- Generically – Stock Options have a positive effect on Perceived Fairness as they use objective performance measures with linear requirements (IM→PIC17 as per FIM→PIC2 and FIM→PIC6). Using objective performance measures, however, makes the plans more susceptible to gaming (IM→PIC19c as per FIM→PIC4) while linear requirements have favourable risk characteristics (IM→PIC18b as per FIM→PIC7).



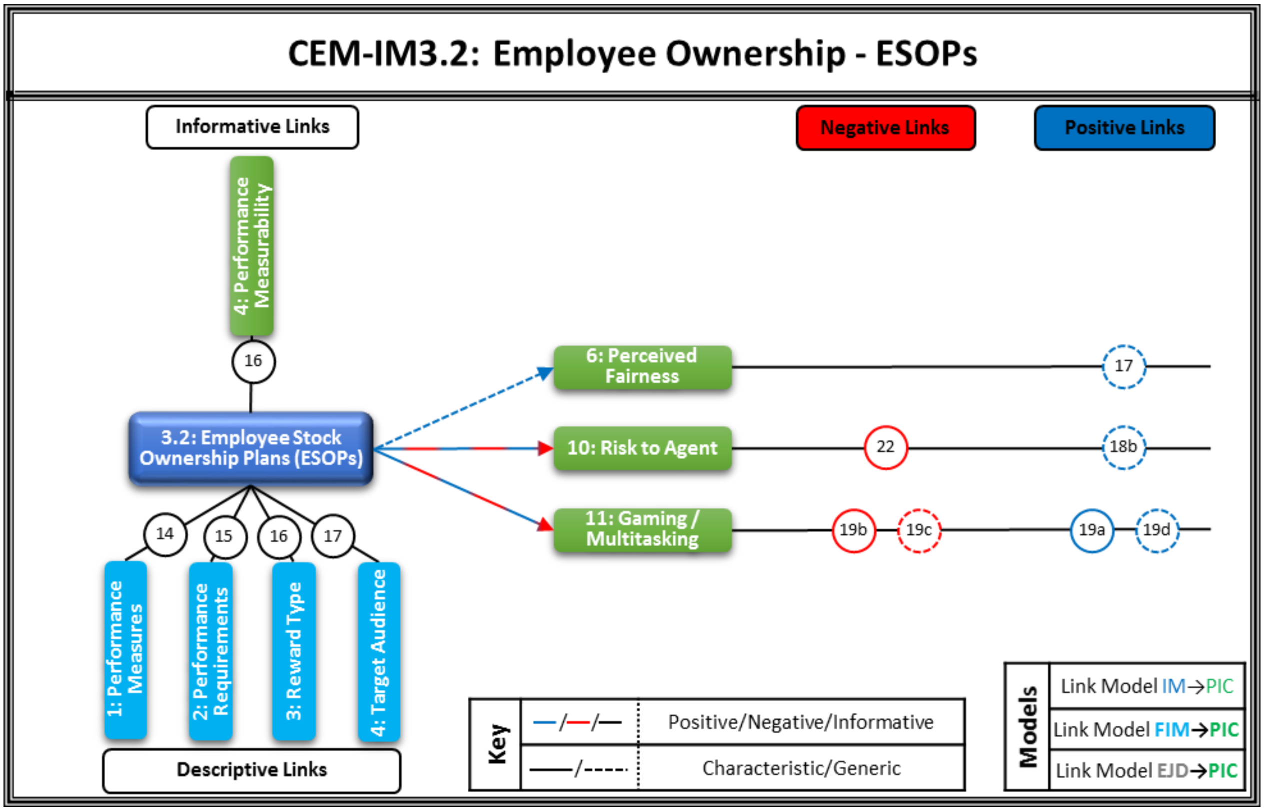


Figure 15-8: CEM-IM3.2: Employee Ownership – ESOPs

Synopsis:

Employee Stock Ownership Plans (ESOPs) are Ownership plans (IM–FIM14, 15, 16, and 17) that provide a company's workforce with an ownership interest in the company. They are typically found when information asymmetries are great and no good performance measures exist (IM→PIC16).

Basic SWOT:

- Characteristically – ESOPs expose employees to downside risks influenced by factors outside of the employees' control (IM→PIC22 as per FIM→PIC3). They can mitigate multitasking problems (IM→PIC19a) but are subject to the free-rider problem (IM→PIC19b as per FIM→PIC20).
- Generically – ESOPs have a positive effect on Perceived Fairness as they use objective performance measures with linear requirements (IM→PIC17 as per FIM→PIC2 and FIM→PIC6). Using objective performance measures, however, makes the plans more susceptible to gaming (IM→PIC19c as per FIM→PIC4) while linear requirements have favourable risk characteristics (IM→PIC18b as per FIM→PIC7). On the other hand using linear or simple performance requirements makes gaming more difficult (IM→PIC19d as per FIM→PIC5).

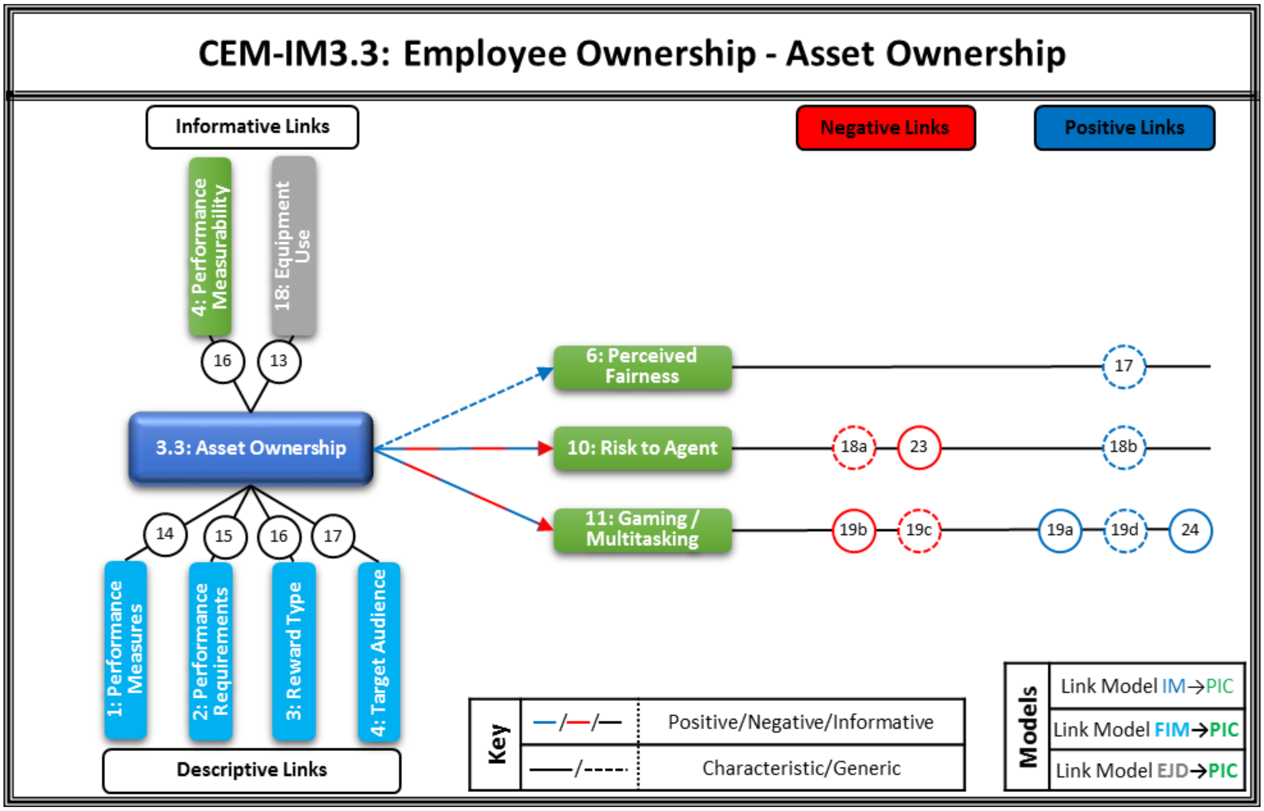


Figure 15-9: CEM-IM3.3: Employee Ownership – Asset Ownership

Synopsis:

Asset Ownership plans are Ownership plans (IM–FIM14, 15, 16, and 17) where necessary assets are owned by the employees as opposed to the organisation. They are typically found when information asymmetries are great and no good performance measures exist (IM→PIC16).

Basic SWOT:

- Characteristically – Asset Ownership plans expose employees to high levels of risk (IM→PIC23) but ensure that employees will take proper care of machinery/assets (IM→PIC24). Asset Ownership can mitigate multitasking problems (IM→PIC19a) but are subject to the free-rider problem (IM→PIC19b as per FIM→PIC20).
- Generically – Asset Ownership plans have a positive effect on Perceived Fairness as they use objective performance measures with linear requirements (IM→PIC17 as per FIM→PIC2 and FIM→PIC6). Using objective performance measures, however, exposes employees to risks (IM→PIC18a as per FIM→PIC7) and makes the plans more susceptible to gaming (IM→PIC19c as per FIM→PIC4). On the other hand, using linear or simple performance requirements has favourable risk characteristics (IM→PIC18b as per FIM→PIC7) and makes gaming more difficult (IM→PIC19d as per FIM→PIC5).

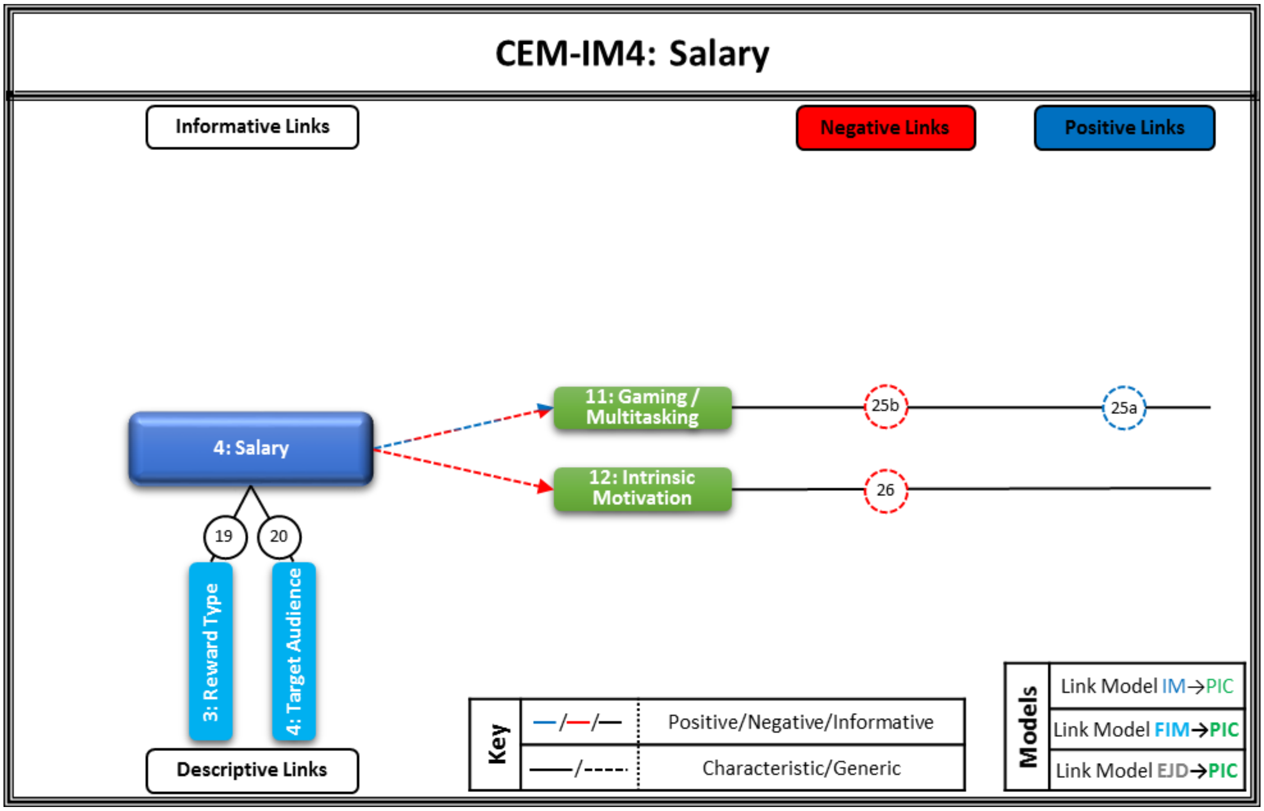


Figure 15-10: CEM-IM4: Salary

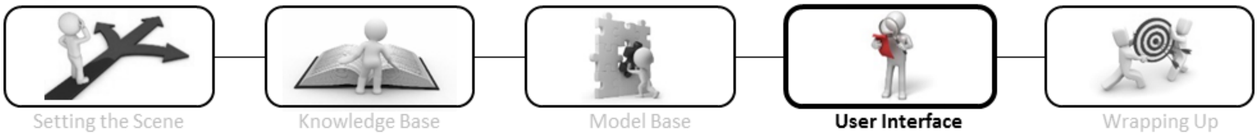
Synopsis:

Salary-based plans incentivise employees through Salary (IM–FIM19) configurations. Salary-based plans are typically applied individually (IM–FIM20).

Basic SWOT:

As Salary-based plans vary greatly the FIMs have to be specified for a specific plan before a meaningful SWOT analysis can be completed. Once the FIMs of the specific plan are selected the FIM→PIC Links can be used to ascertain the positive and negative links.

- Generally – Salary-based incentive plans have a negative effect on Intrinsic Motivation as they use tangible rewards as extrinsic motivators (IM→PIC26 as per FIM→PIC17). As Salary-based plans are individually based they typically act as a deterrent to social loafing (IM→PIC25a as per FIM→PIC20a), but have a negative effect on cooperation (IM→PIC25b as per FIM→PIC20c).



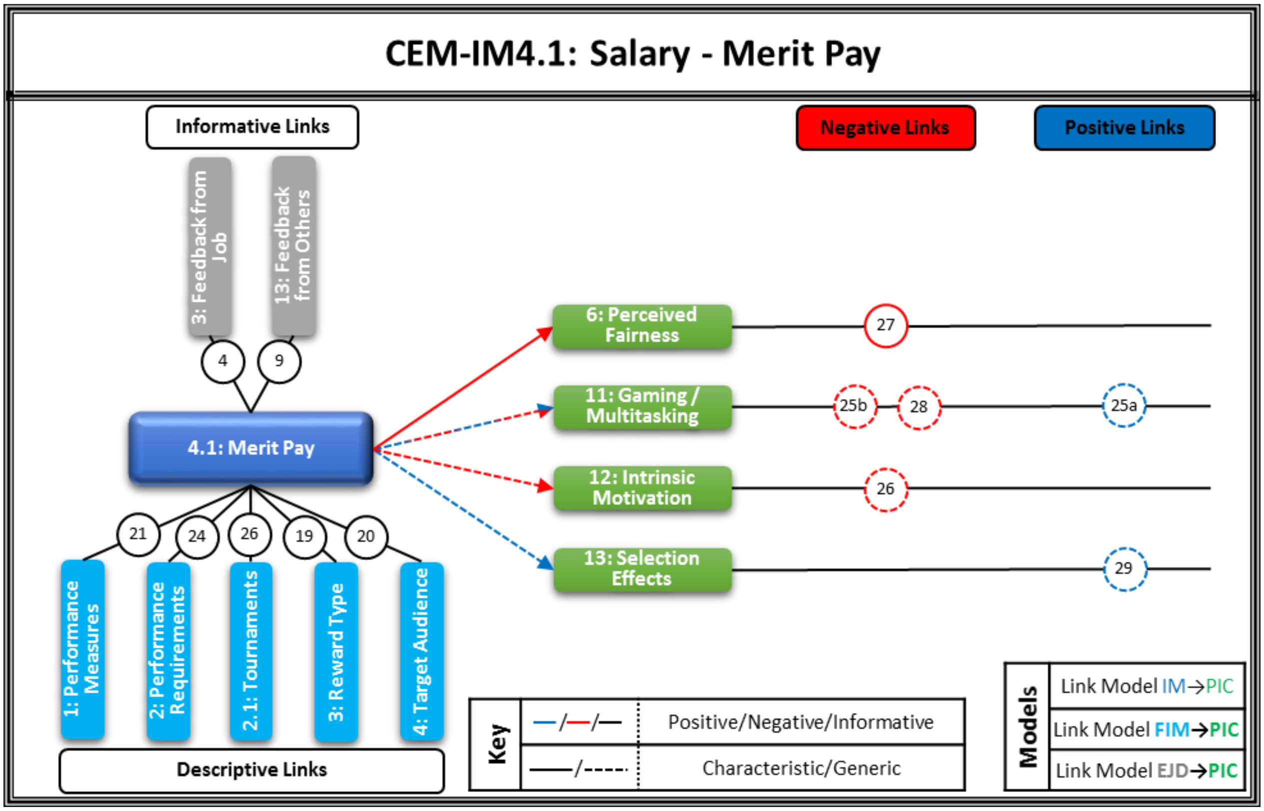


Figure 15-11: CEM-IM4.1: Salary – Merit Pay

Synopsis:

Merit Pay is a Salary-based incentive plan where an increase in basic pay (IM–FIM19) is determined by an assessment (IM–FIM21) of individual performance (IM–FIM20). The increase can be linearly tied to some performance criteria, follow a more complicated formula, or utilise forced-distribution performance-rating systems (IM–FIM24 and IM–FIM26). The EJD Feedback from Job (EJD→IM4) and Feedback from Others (EJD→IM9) can be used to improve the effectiveness of Merit Pay.

Basic SWOT:

- Characteristically – Care has to be taken to ensure Merit Pay plans are perceived as fair and accurate as they can be complicated, multifaceted, and even incorporate aspects of tournaments (IM→PIC27 as per FIM→PIC2, 6, and 14).
- Generally – Merit Pay can have positive Selection Effects (IM→PIC29 as per FIM→PIC4 and FIM→PIC22) and act as a deterrent to social loafing (IM→PIC25a as per FIM→PIC20a) as it is focused on individual performance, but has a negative effect on cooperation (IM→PIC25b as per FIM→PIC20c). Merit Pay has a negative effect on Intrinsic Motivation as it uses tangible rewards as extrinsic motivators (IM→PIC26 as per FIM→PIC17). Various dysfunctional responses are also possible, especially if tournament-related aspects are used (IM→PIC28 as per FIM→PIC4 and FIM→PIC5).

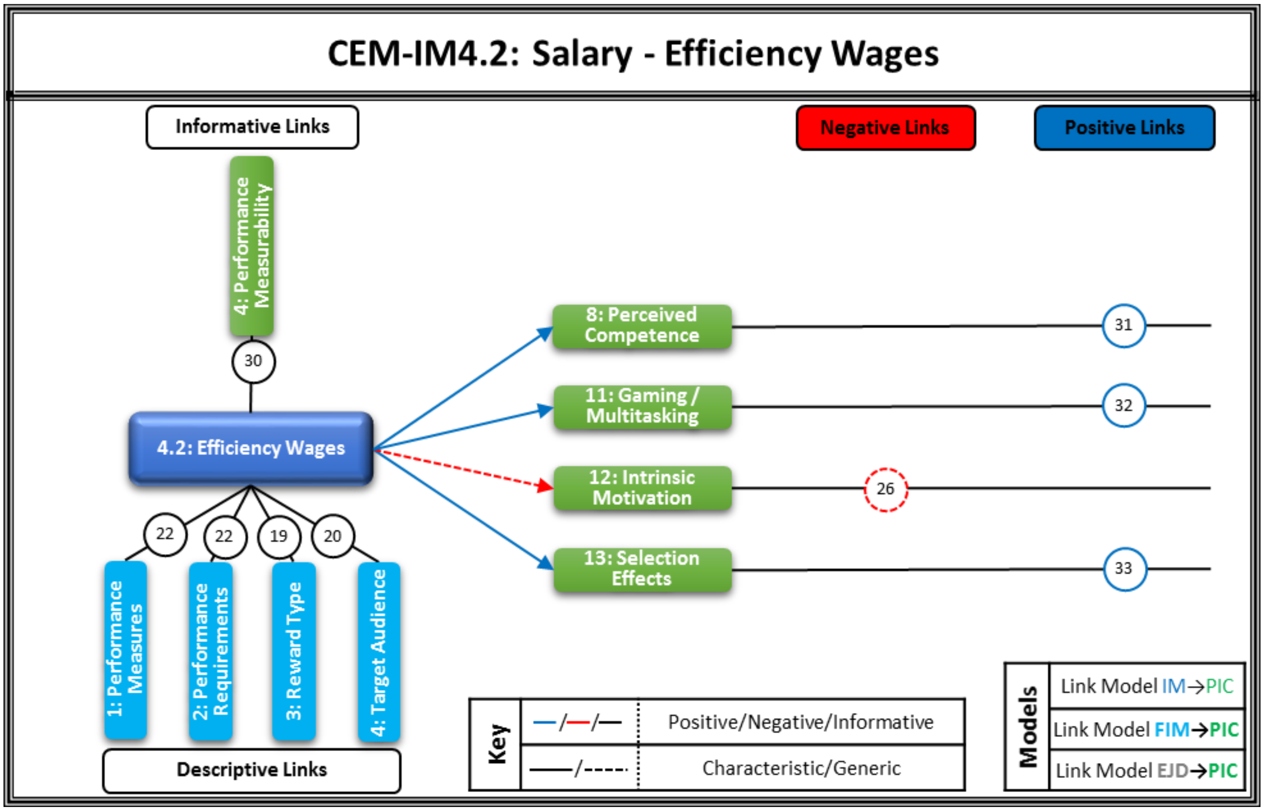


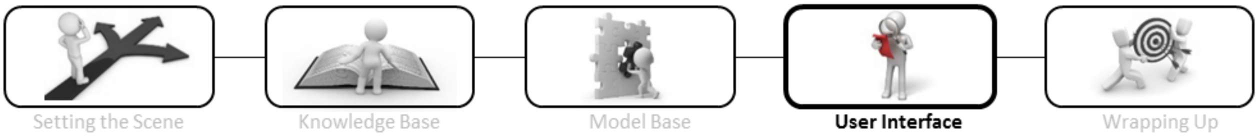
Figure 15-12: CEM-IM4.2: Salary – Efficiency Wages

Synopsis:

Efficiency Wages is a Salary-based incentive plan (IM–FIM20) where employees are paid higher than market rates (IM–FIM19) to make their jobs more valuable to them. There is thus no performance contingent reward, barring continued employment (IM–FIM22). Efficiency Wages work well when performance is hard to measure (IM→PIC30).

Basic SWOT:

- Characteristically – Efficiency Wages has a positive effect on Perceived Competence (IM→PIC31) and helps to attract and retain top employees (IM→PIC33). It also decreases the likelihood of employees engaging in Gaming/Multitasking activities as they value their jobs (IM→PIC32).
- Generally – Efficiency Wages has a negative effect on Intrinsic Motivation as it uses tangible rewards as extrinsic motivators (IM→PIC26 as per FIM→PIC17).



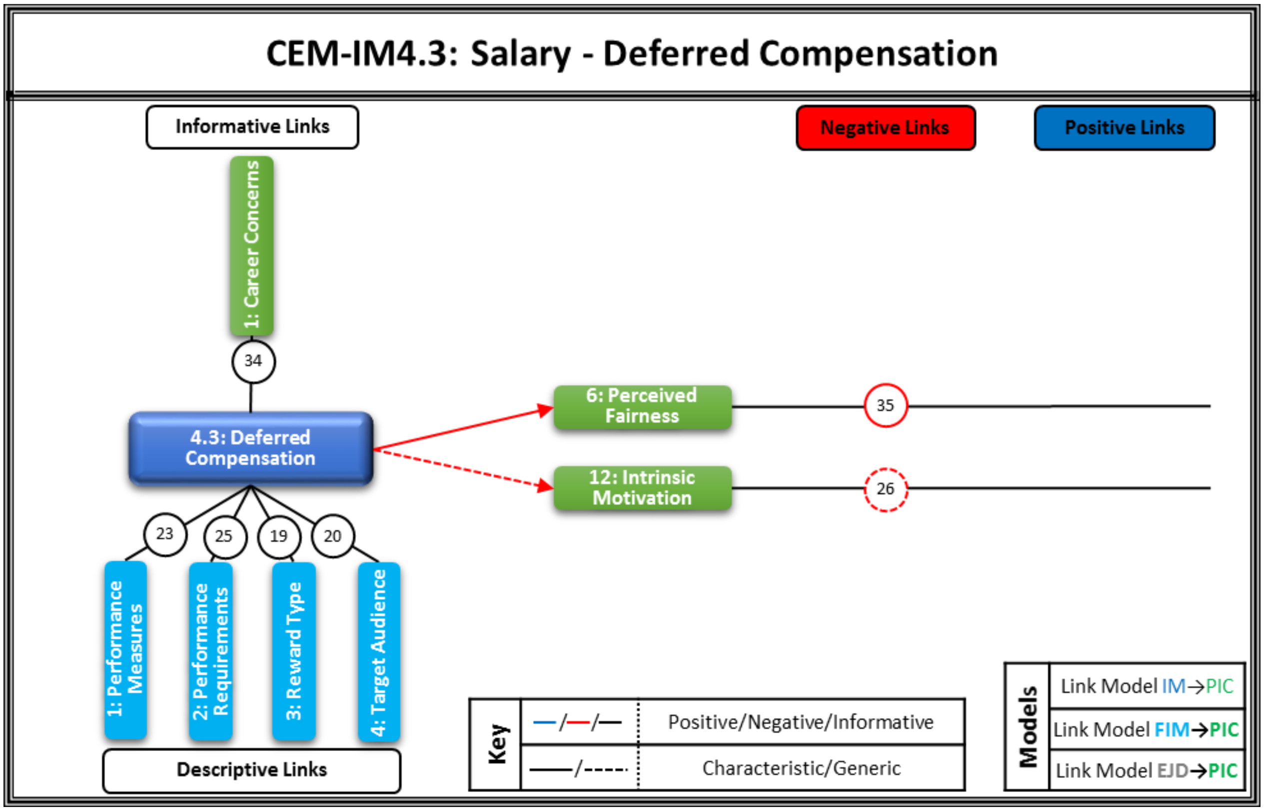


Figure 15-13: CEM-IM4.3: Salary – Deferred Compensation

Synopsis:

Deferred Compensation is a Salary-based incentive plan (IM–FIM19 and IM–FIM20) or arrangement whereby a portion of an employee's income is paid out at a later date than when the income was actually earned, sometimes leading to workers being overpaid when they are old at the cost of being underpaid when they are young (IM–FIM23 and IM–FIM25). New/young employees with long-term Career Concerns are typically more accepting of Deferred Compensation practices (IM→PIC34).

Basic SWOT:

- Characteristically – Deferred Compensation has a negative effect on Perceived Fairness (IM→PIC35).
- Generally – Deferred Compensation has a negative effect on Intrinsic Motivation as it uses tangible rewards as extrinsic motivators (IM→PIC26 as per FIM→PIC17).

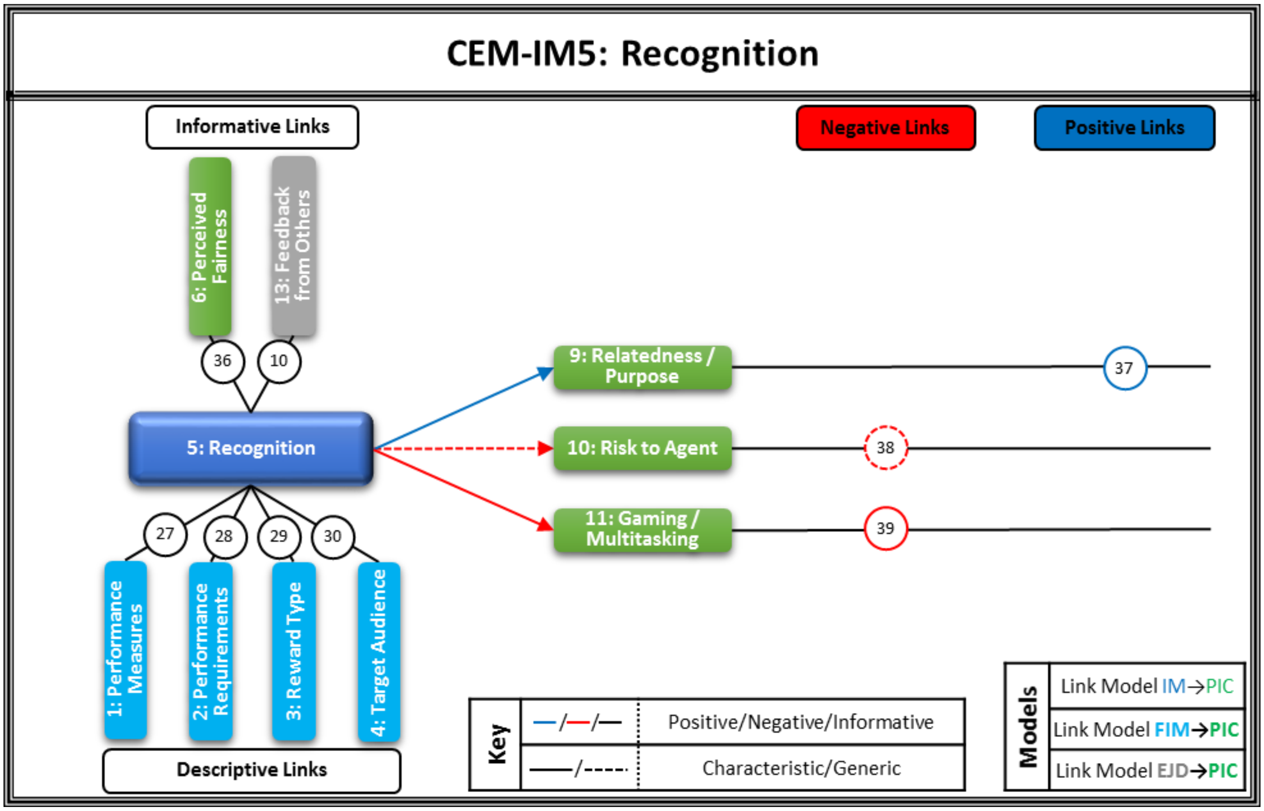


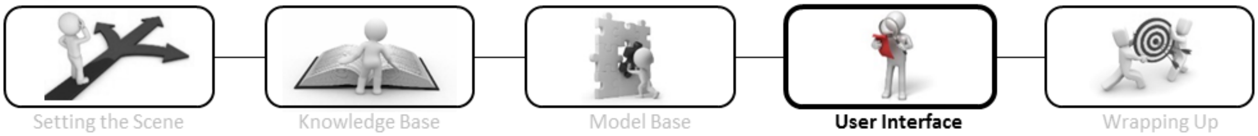
Figure 15-14: CEM-IM5: Recognition

Synopsis:

Recognition Plans incentivise employees through expressed appreciation for an employee's behaviours, activities, or impact in an organisation (IM–FIM27 and IM–FIM28) in the form of simple gestures as well as symbolically through the receiving of an award (IM–FIM29). Recognition Plans can be applied to individuals, groups, or the organisation as a whole (IM–FIM30). The effectiveness of Recognition Plans decreases if healthy levels of Perceived Fairness are not maintained (IM→PIC36). The EJD Feedback from Others (EJD→IM10) can be used to improve the effectiveness of Recognition Plans.

Basic SWOT:

- Characteristically – Recognition Plans improve employees' sense of Relatedness/Purpose (IM→PIC37), but even with Recognition Plans employees can still manipulate the 'measurements' by currying favour instead of optimising performance (IM→PIC39).
- Generally – Recognition Plans can expose employees to some risk as they are typically non-linear (IM→PIC38 as per FIM→PIC7).



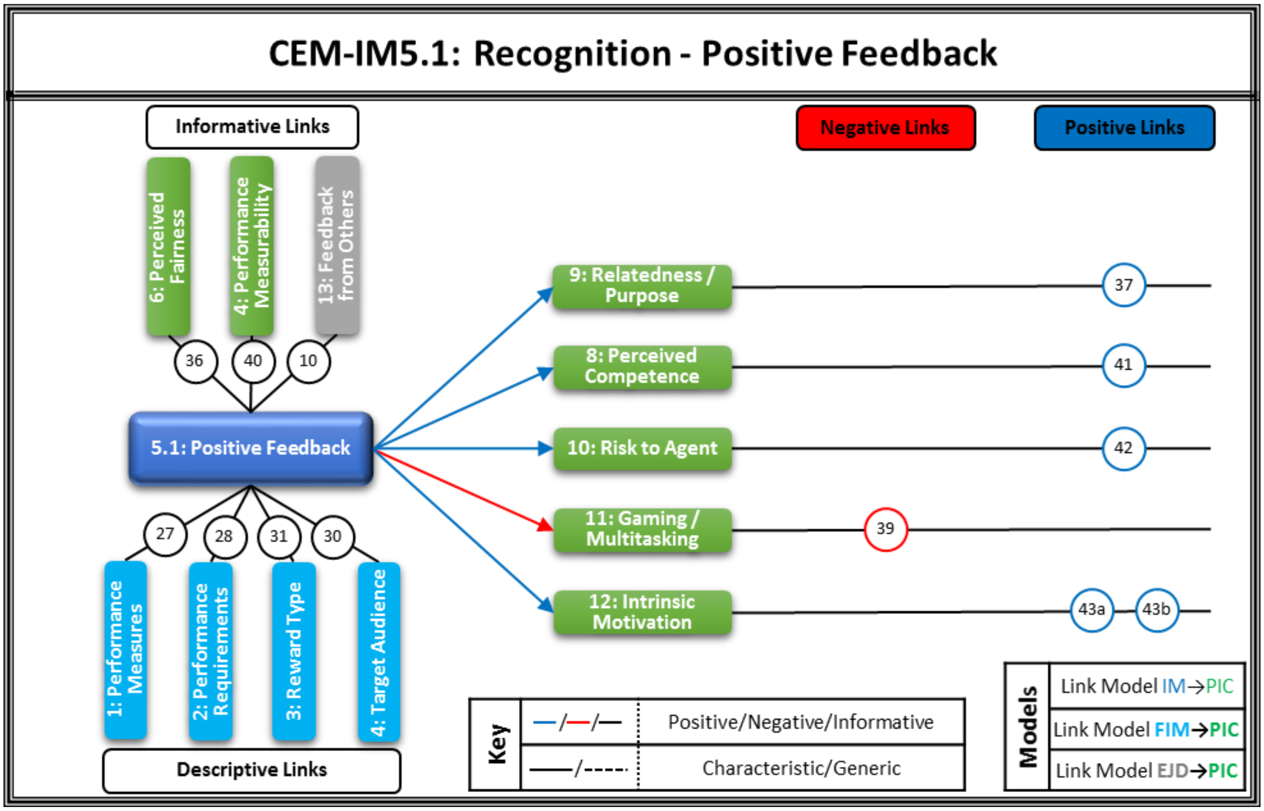


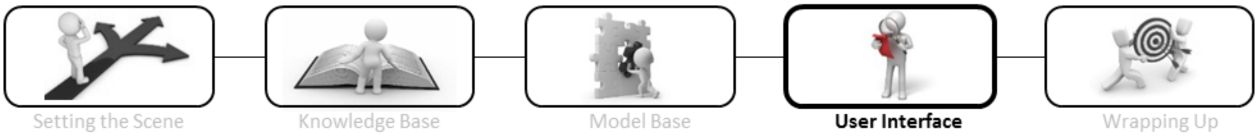
Figure 15-15: CEM-IM5.1: Recognition - Positive Feedback

Synopsis:

Positive Feedback is a form of Recognition (IM–FIM30) that incentivises employees by providing them with positive verbal feedback (IM–FIM31) regarding their performance effectiveness (IM–FIM27 and IM–FIM28). Positive Feedback is a good IM option in situations where performance is hard to measure (IM→PIC40). The effectiveness of Positive Feedback decreases if healthy levels of Perceived Fairness are not maintained (IM→PIC36). The EJD Feedback from Others (EJD→IM10) can be used to improve the effectiveness of Positive Feedback.

Basic SWOT:

- Characteristically – Positive Feedback improves employees' sense of Relatedness/Purpose (IM→PIC37) and level of Perceived Competence (IM→PIC41) which leads to improved Intrinsic Motivation (IM→PIC43a). Positive Feedback is not expected to crowd out Intrinsic Motivation (IM→PIC43b), but even with Positive Feedback employees can still manipulate the 'measurements' by currying favour instead of optimising performance (IM→PIC39).



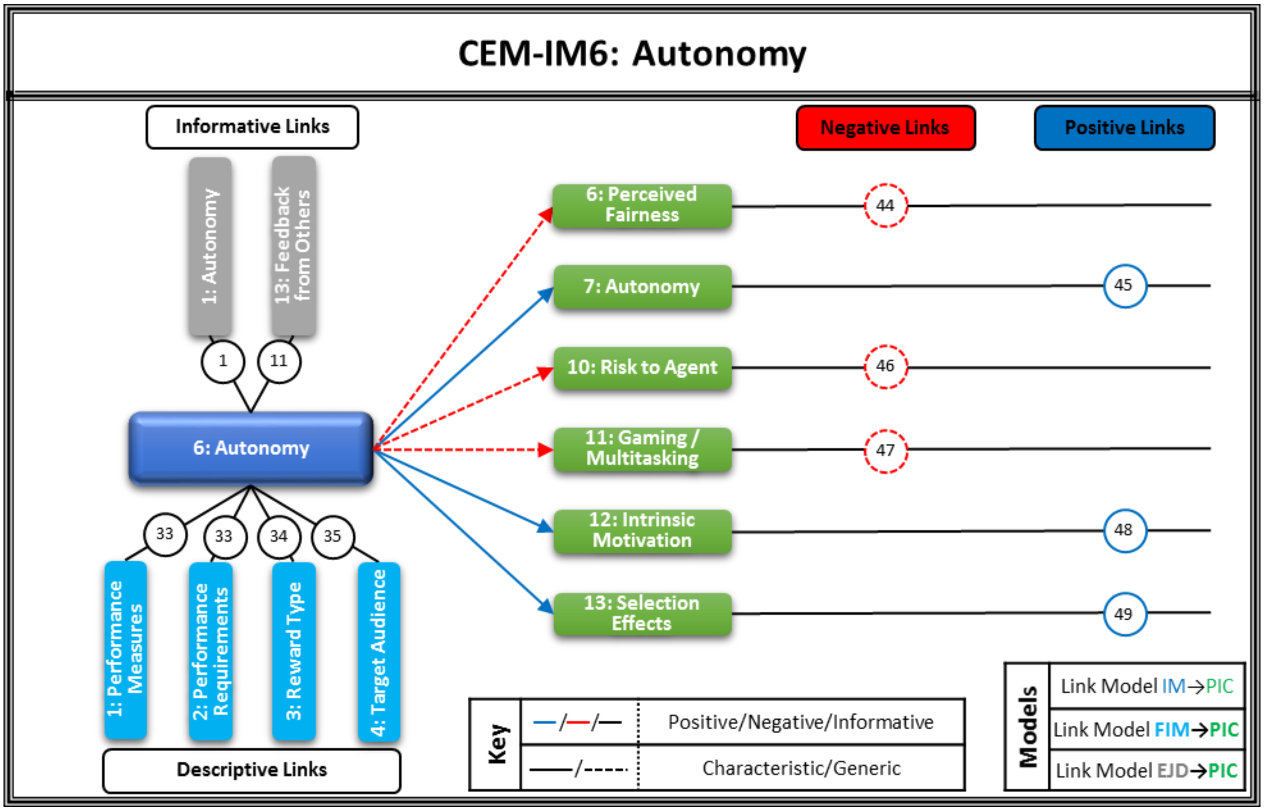


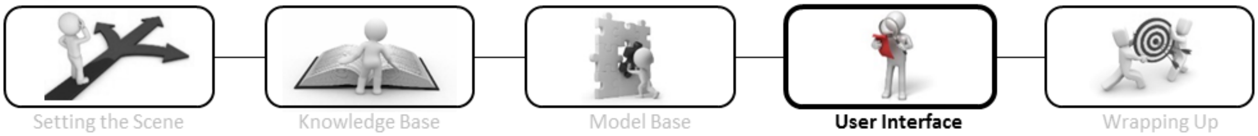
Figure 15-16: CEM-IM6: Autonomy

Synopsis:

Autonomy plans incentivise employees by increasing their level of Autonomy (IM–FIM34) as a reward for good performance (IM–FIM33 and IM–FIM34). Autonomy as Incentive Mechanism can be applied to individuals, groups, or the organisation as a whole (IM–FIM35). The EJD Autonomy (EJD→IM1) and Feedback from Others (EJD→IM11) can be used to improve the effectiveness of Autonomy plans.

Basic SWOT:

- Characteristically – Autonomy plans inherently provide employees with more Autonomy (IM→PIC45) and improve Intrinsic Motivation (IM→PIC48). Autonomy plans also attract employees who value Autonomy (IM→PIC49).
- Generally – As Autonomy plans typically use subjective measures with non-linear performance requirements they have a negative effect on Perceived Fairness (IM→PIC44 as per FIM→PIC2 and FIM→PIC6), expose employees to risks (IM→PIC46 as per FIM→PIC3 and FIM→PIC7), and introduce opportunities for Gaming/Multitasking (IM→PIC47 as per FIM→PIC4 and FIM→PIC5).



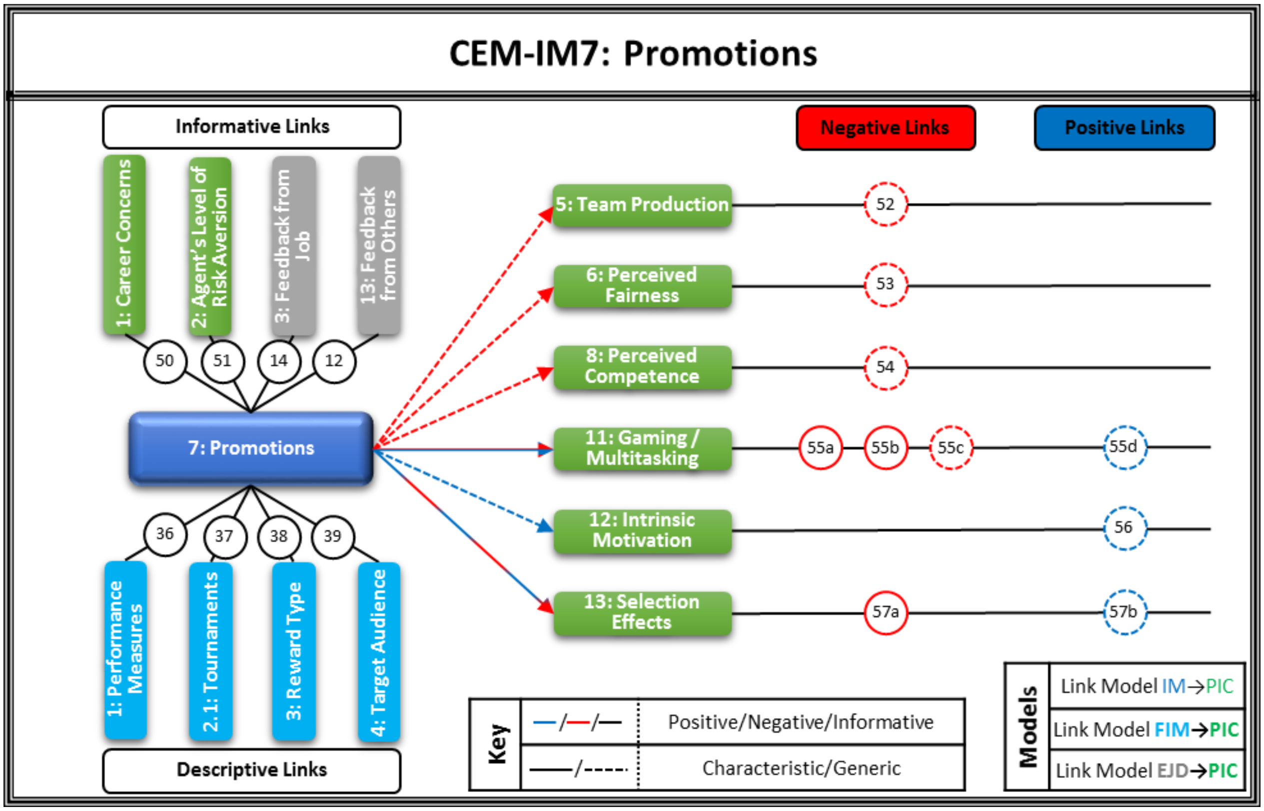


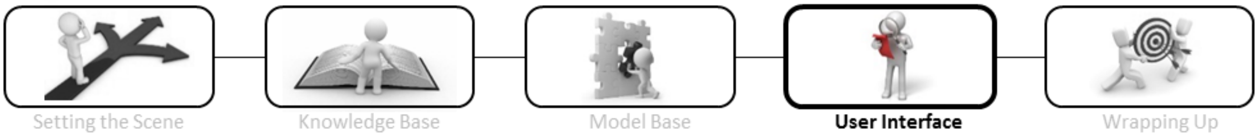
Figure 15-17: CEM-IM7: Promotions

Synopsis:

Promotions incentivise employees with the advancement of an employee's rank or position (IM–FIM38) in an organisational hierarchy system. A promotion is typically only awarded to the best candidate (IM–FIM37 and IM–FIM39) based on a mixture of subjective and objective performance measures (IM–FIM36). Employees with Career Concerns will be specifically concerned about promotion-related incentives (IM→PIC50). Employees with a high level of risk aversion may prefer tournament-based Promotions to Piece Rates (IM→PIC51). The EJD Feedback from Job (EJD→IM14) and Feedback from Others (EJD→IM12) can be used to improve the effectiveness of Promotions.

Basic SWOT:

- Characteristically – Promotions, especially through tournaments, can lead to a suboptimal resource allocation situation (IM→PIC57a). Promotions have no effect on average and poor performing employees (IM→PIC55a) and are only effective when there is an opportunity for promotion (IM→PIC55b).
- Generally – Promotions are attractive to high-performing employees (IM→PIC57b as per FIM→PIC13) and are not conducive to social loafing (IM→PIC55d as per FIM→PIC20), but can cause complications in team settings (IM→PIC52 and IM→PIC55c as per FIM→PIC11 and FIM→PIC23). The tournament-based nature of Promotions can have a negative effect on Perceived Fairness (IM→PIC53 as per FIM→PIC14) and Perceived Competence (IM→PIC54 as per FIM→PIC9). Promotion-based incentive plans are not expected to crowd out Intrinsic Motivation (IM→PIC56 as per FIM→PIC17).



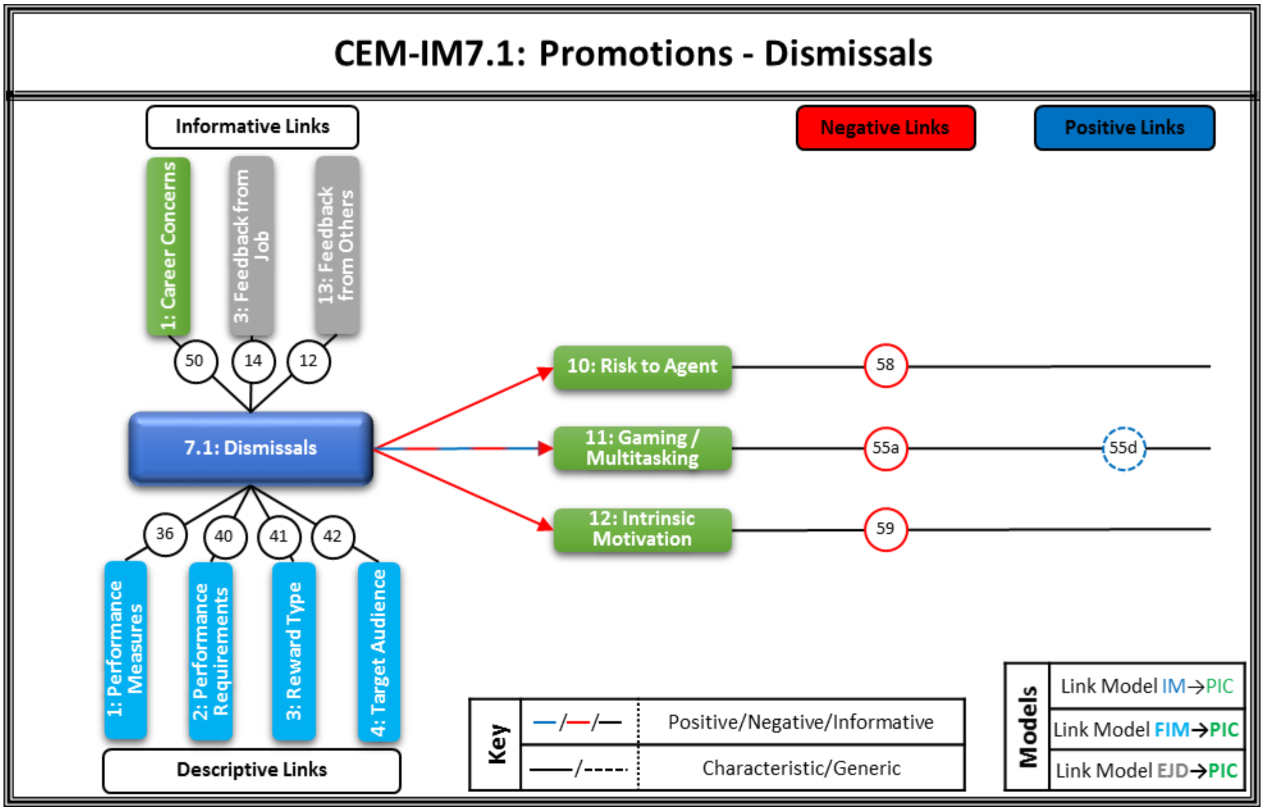


Figure 15-18: CEM-IM7.1: Promotions – Dismissals

Synopsis:

Dismissals, or the threat of dismissal, incentivise employees with the threat of termination of employment (IM–FIM41) by an employer against the will of the employee. Dismissals are typically applied to employees who fail to reach some minimum level of performance (IM–FIM40 and IM–FIM42) based on a mixture of subjective and objective performance measures (IM–FIM36). Employees with Career Concerns will be specifically concerned about Dismissals (IM→PIC50). The EJD Feedback from Job (EJD→IM14) and Feedback from Others (EJD→IM12) can be used to improve the effectiveness of the threat of Dismissals.

Basic SWOT:

- Characteristically – The use of Dismissals as an Incentive Mechanism exposes employees to risks (IM→PIC58) and leads to a decrease in Intrinsic Motivation (IM→PIC59). Dismissals have no effect on average to good performing employees (IM→PIC55a).
- Generally – Promotions are not conducive to social loafing (IM→PIC55d as per FIM→PIC20).

15.4) Summary

This subsection concludes Chapter 15: The Cascading Effects Models

The 17 Cascading Effects Models (CEMs) illustrate what one would see when all the links connected to a specific type of IM, or subtype of IM, are shown across the various link models. Each CEM is accompanied by a short synopsis and SWOT analysis.

The CEMs can be used to quickly discern:

- Positive and negative influences or links that a specific IM has on PICs.
- A reference to the Features of Incentive Mechanisms for a specific PIC.
- Any EJD that can be used to improve the use of a specific IM.

Chapter 16: Towards a Mature User Interface

"It is always wise to look ahead,

but difficult to look further than you can see."

-Winston Churchill

16.1) Introduction

This subsection introduces Chapter 16: Towards a Mature User Interface.

Recall that while the research delivers a functional DSS, the User Interface (UI) is not mature. The UI has been developed to a degree where the DSS's use can be demonstrated, but not to such a degree that the DSS is ready for commercial use. This chapter discusses how the existing constructs could be developed further before discussing what a mature UI would look like on a conceptual level. As with the DSS in general, the development is focused on improving decision-making in terms of both quality and speed.

Chapter 16 discusses how the existing constructs could be developed further before discussing what a mature UI would look like on a conceptual level. This chapter is structured as follows:

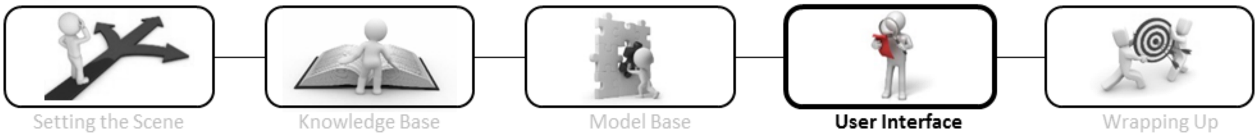
- Chapter 16.1) Introduction
- Chapter 16.2) Development of Existing Constructs
    - Various ways that existing constructs could be developed further are discussed.
- Chapter 16.3) Towards a Mature User Interface: Conceptual Development
    - The conceptual, or high-level, development of the User Interface is discussed.
- Chapter 16.4) Summary

16.2) Development of Existing Constructs

This subsection discusses various ways existing constructs could be developed further.

16.2.1) Software/Computerised Interface

Converting the existing User Interface (UI) into an electronic format would greatly increase the usability of the DSS. Users would be able to access information much faster. Every Link Model, including the Integrated Links Model (ILM) segments, and the Cascading Effects Models (CEMs) is made up of a collection of nodes and links. The information describing each node and link is contained in a set of lists. Users would typically have to use the designations provided on the various visual models to find the corresponding information in the lists in the Knowledge Base (KB), and page between different visual models in the Model Base (MB) to examine different Link Models, ILM Segments, or CEMs. An electronic format could improve current use through retrieving this information automatically. Users could jump between models, 'pull up' a summary or details for any node or link, and access existing and prospective constructs at the click of a button. Figure 16-1 illustrates how an interactive electronic UI could provide users with basic information in the form of a pop-up when a link or node is clicked on. This would be applicable to the Link Models, ILM Segments, CEMs, and any other future constructs.



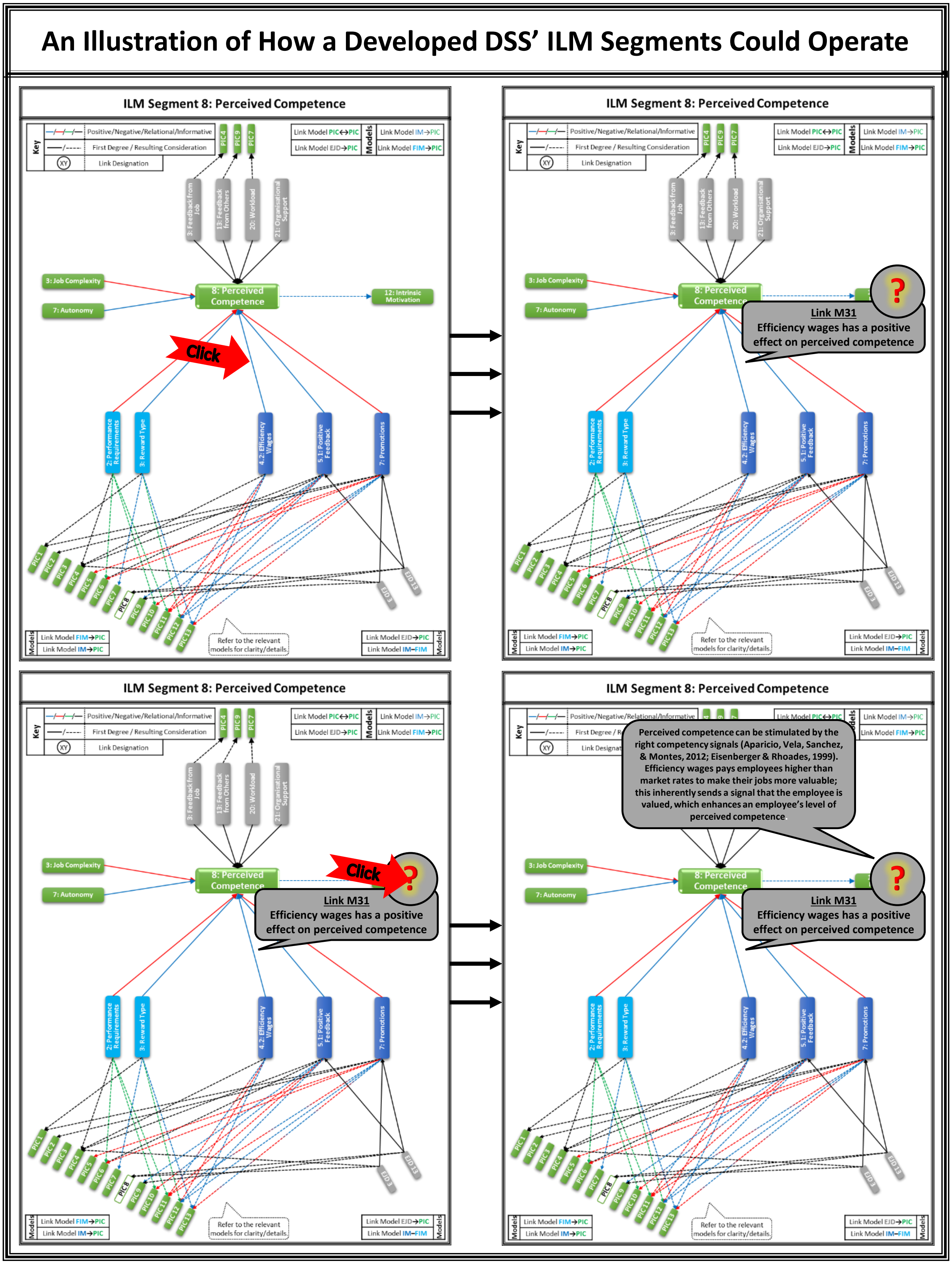


Figure 16-1: An illustration of how a developed DSS's ILM segment could be interactive

16.2.2) Template and Information-processing Aids

Using the DSS helps users to make various discernments. Depending on their use of the DSS, users could be left with a considerable collection of discernments to process (see Chapter 17 and Table F-13, Table F-14, and Table F-15 in Appendix F for specific examples). The rudimentary DSS does not assist users with this process. A mature UI could provide users with templates to aid in this process. Combined with a computerised UI such templates could perform certain functions automatically, organise discernments based on simple inputs, and ultimately help users to process the information in a more efficient manner.

16.2.3) Guidelines

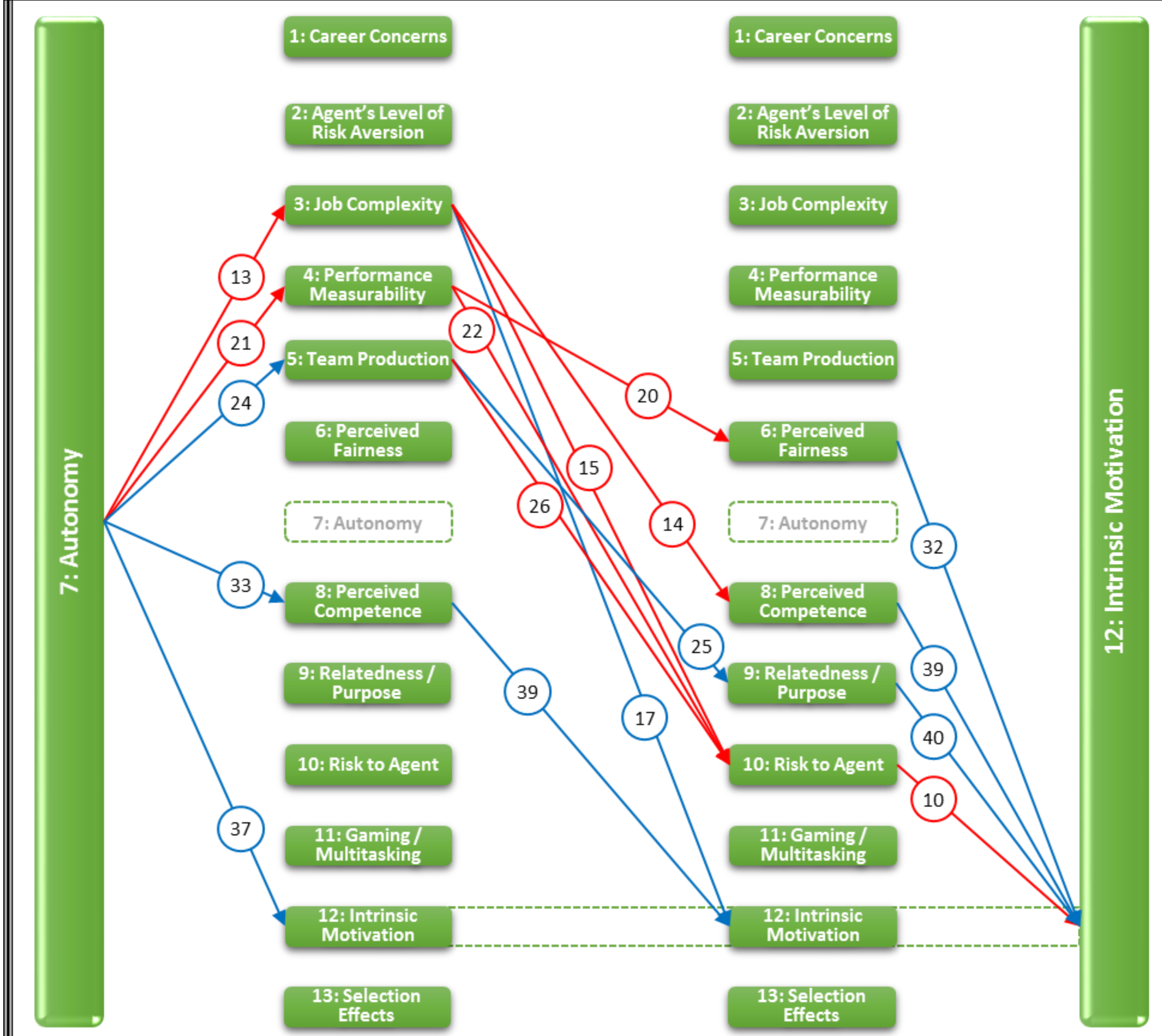
The UI contains various constructs that could be used in various ways to achieve various goals. The DSS is thus a versatile tool that could be used in creative ways by familiar users. Users who are not familiar with the DSS would not be able to use it as effectively. The DSS could mitigate this limitation by providing users with guidelines that guides them through various processes. This could be combined with a computerised UI to make the process even faster.

16.2.4) Additional Constructs

The nature of the information driving the DSS, considering the complex spiderweb conceptualisation (Chapter 13.2), allows various secondary constructs to be developed. The UI could provide users with a range of additional illustrations and comparisons. For example, consider a case where a user might want to conduct a detailed analysis reviewing how one PIC affects another PIC. The user could use Link Model PIC↔PIC (the links between the PICs) to search for all the primary, secondary, and tertiary links between the PICs in question. A mature DSS's UI could however speed this process up by including a function whereby the relationship between two PICs could be 'generated' with a simple command. What this might look like is illustrated in Figure 16-2. An image like this would be included for the links between every two PICs, and this could be extended to other nodes as well. Various other constructs might be devised that help users to study, visualise, or conceptualise further considerations:

- Which IMs can typically be used to mitigate the negative effect of another IM on a certain PIC?
- Which IMs or Elements of Job Design (EJD) have the most positive links with a specified collection of PICs?
- Which IMs or EJD can be used without influencing a specified collection of PICs directly?
    - Which secondary effect should be considered in such a situation?
- How can the DSS be used to:
    - Perform a risk analysis?
    - Identify opportunities for improvement?
    - Analyse the use of a specific IM?

The Connections Between PIC7 and PIC12 to the 3rd Degree



First Degree Link	Second-Degree Links	Third-Degree Links
(PIC↔PIC37)	(PIC↔PIC13)→[PIC3]→(PIC↔PIC17) (PIC↔PIC33)→[PIC8]→(PIC↔PIC39)	(PIC↔PIC21)→[PIC4]→(PIC↔PIC20)→[PIC6]→(PIC↔PIC32) (PIC↔PIC13)→[PIC3]→(PIC↔PIC14)→[PIC8]→(PIC↔PIC39) (PIC↔PIC24)→[PIC5]→(PIC↔PIC25)→[PIC9]→(PIC↔PIC40) (PIC↔PIC13)→[PIC3]→(PIC↔PIC15)→[PIC10]→(PIC↔PIC10) (PIC↔PIC21)→[PIC4]→(PIC↔PIC22)→[PIC10]→(PIC↔PIC10) (PIC↔PIC24)→[PIC5]→(PIC↔PIC26)→[PIC10]→(PIC↔PIC10)

Key			
(X)	Link Number	◯ / ◯	Positive / Negative

Figure 16-2: An illustration of prospective UI constructs – The links between two PICs

16.3) Towards a Mature User Interface: Conceptual Development

This subsection discussing how the User Interface could be developed further on a conceptual level.

A mature User Interface (UI) would include development beyond the improvements or extensions to the existing constructs as discussed in Chapter 16.2. This could involve an extra connectedness layer in the UI, and further information-processing capabilities to improve the quality of the information that the user is presented with.

16.3.1) The High-level User Interface: An Extra Connectedness Layer

If employee incentives are pictured as a car, the existing UI constructs would be suitable for a mechanic. One avenue of development would be to make the mature UI suitable for a driver rather than a mechanic. The existing constructs give the user access to the underlying workings of the models, but do not provide streamlined interaction or specific guidance as to how to use it. It does not provide a vehicle that the user can drive; rather it provides the user with the schematics for a suitable vehicle. The existing UI is in some ways an extension to the Model Base, rather than a mature UI.

Adding a layer that hides the underlying workings of the DSS, and helps the users to interact only with the relevant information, can take various forms and can be achieved with various functions. 'Filtering' is discussed as an example in the next subsection.

16.3.2) Targeted Information: Filtering

Users are currently presented with a significant body of knowledge, but left to apply it manually. One way to help users to interact with the Knowledge Base (KB) and (MB) more effectively would be through presenting them with targeted information. This could be done through filtering.

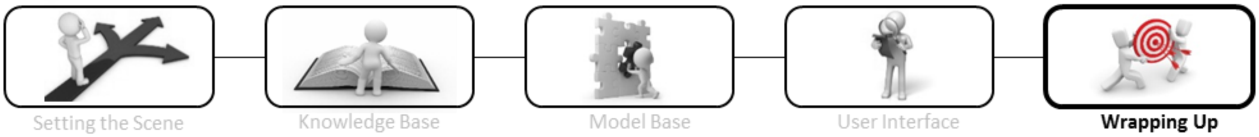
Filtering involves presenting users only with the information in the KB or MB that is most relevant to them. This could be achieved by having users answer certain questions before presenting them with the entire KB and MB. The answers to the questions could be used to identify which PICs the users are most likely to be concerned with. In the same way a set of questions could narrow down the options or links that would be most applicable to a specific user with regard to a specific PIC.

On a high level the information in the KB is 'filtered' from the existing literature on incentives and employee motivation. Further filtering to improve the quality of information to a specific individual in a specific situation seems to be a natural extension.

16.4) Summary

This subsection concludes Chapter 16: Towards a Mature User Interface: Development Opportunities.

The User Interface (UI) could be improved in various ways. Improvements should focus on improving decision-making in terms of quality and/or speed. The most obvious opportunity for further development would be to convert the DSS into an electronic format. Users would be able to navigate the various models and access information with much greater speed. Further development opportunities regarding existing constructs include; providing templates or other aids to help users process information or discernments made using the DSS, providing guidelines that help users to perform various exercises using the DSS, and designing further constructs that help users to understand/compare/analyse/process information in the Knowledge Base and/or Model Base. On a high level a mature UI could include an extra connectedness layer that is more user-friendly, and filtering capabilities to provide users with targeted information.

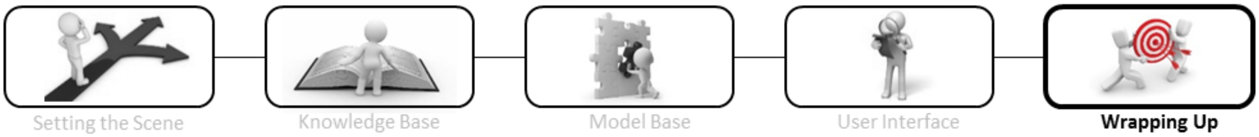


SECTION E: WRAPPING UP

Chapter 17 demonstrates the use of the rudimentary DSS developed in SECTION B, C, and D. The verification and validation of the DSS can be found in Chapter 18. This is followed by the conclusion in Chapter 19.

SECTION E proceeds as follows:

- Chapter 17 **Demonstrates** the use of the DSS with two Hypothetical Illustrative Case Studies.
- Chapter 18 proceeds with the **Verification and Validation**.
- Chapter 19 finishes with the **Conclusion**.



Chapter 17: Demonstration

"Everything should be made as simple as possible, but not simpler."

-Albert Einstein

17.1) Introduction

This subsection introduces Chapter 17: Demonstration.

The use of the artefact developed in SECTION B, C, and D is demonstrated in this chapter. This serves as the initiation of the verification and validation process specifically discussed in Chapter 18, and extends the Model Base (MB) and User Interface (UI) sections by demonstrating how the DSS is used. The purpose of verification and validation is as follows:

- Verification shows that the solution meets the solution requirements.
- Validation shows that the solution accomplishes its intended purpose.

This chapter is limited to a demonstration of the use of the artefact. In addition to verifying whether the design requirements as per the DSS framework selection have been met, the next chapter (Chapter 18), verifies the use of the DSS against the high-level requirements in light of the demonstration chapter.

The DSS provides users with various tools, and a database, that can be applied in numerous ways to make better decisions, and perhaps more importantly, to make them faster. The demonstration chapter does not attempt to catalogue every possible use of the DSS. The focus is on providing a collection of illustrations that help users to understand how the DSS can be used in a customised fashion to improve decision-making in various ways. At the end of the demonstration chapter users should understand that the DSS does not contain a linear process that is to be followed, but a formulation of models and knowledge that can be applied in numerous ways according to the user's needs.

Chapter 17 is structured as follows:

- Chapter 17.1) Introduction
- Chapter 17.2) Approach
  - Hypothetical Illustrative Case Studies are introduced as the demonstration's approach.
- Chapter 17.3) An Overview of Hypothetic Illustrative Case Study 1 (as recorded in Appendix F.1)
  - The first Hypothetical Illustrative Case Study.
- Chapter 17.4) An Overview of Hypothetic Illustrative Case Study 2 (as recorded in Appendix F.2)
  - The second Hypothetical Illustrative Case Study.
- Chapter 17.5) Further Examples
  - Examples of how the DSS might be used in other situations are provided.
- Chapter 17.6) Summary

17.2) Approach

This subsection describes and justifies the approach that the demonstration follows, explains how this forms part of the iterative process used to build and improve the DSS, and outlines the format of the Hypothetical Illustrative Case Studies.

The approach used in the demonstration chapter serves the secondary function of helping to improve the DSS itself. This fits well with the pragmatic approach of learning by building, where various iterations are done to improve a model.

17.2.1) Hypothetical Illustrative Case Studies (HICS)

In order to demonstrate the use of the DSS various applications in Hypothetical Illustrative Case Studies (HICS) will be considered. Firstly note that this does not imply that case studies are adopted as a research method. Instead, if the HICS are categorised as case studies, an alternative use is adopted for demonstration purposes. This is in a similar vein as “those who might use case studies as a teaching tool” (Yin, 2009, p. 4). More specifically, the theoretical purpose of the HICS is to act as an ‘illustrative case study’, which aims to “give the reader a feel for a theoretical argument by providing a concrete example of its application” (Levy, 2008, p. 6). Secondly, note that the HICS are hypothetical. Situations are sketched with various characteristics to demonstate that the DSS’s use is not limited by a specific target audience, type of user, or state of current practices. While the HICS are both in the engineering domain there is no reason to except the usability would decrease in other settings. Note that the purpose of the HICS is not to prove the validity of the artefact, but to demonstrate its use and help to verify that it meets the design requirements.

The primary objective of the HICS is consequently to demonstrate that the designed artefact, the DSS, can be used to improve an organisation’s practices regarding employee incentives. This will be accomplished by considering two scenarios where the DSS can be used. Various applications will be illustrated in each scenario. More than one scenario is considered to demonstrate how the DSS functions in different settings. Two scenarios are selected that have different characteristics in terms of:

- Target audience – The DSS might be used to improve the motivation of employees ranging from front-line employees to middle management and above. HICS1 focuses on artisans who are skilled manual labourers, and HICS2 focuses on engineering graduates who are knowledge workers.
- Users – The users of the DSS can have different positions in a company varying from front-line managers through middle management to upper management. HICS1 considers an owner of a small company, and HICS2 considers a middle manager in a large company.
- State of incentives or motivational approach – The DSS can be used to evaluate and improve established formal or informal incentive systems. While it could be used during the design in a setting where no practices have been established, this is not the focus. HICS1 considers a setting with few to no incentive practices, HICS2 considers a situation with established practices.

Discussing all possible applications of the DSS in a specific HICS would be excessive and cumbersome. As discussed in the introduction to this chapter, the aim is to illustrate how the DSS can be used in a customisable fashion, and not to catalogue every possible use. This aligns well with the description of illustrative case studies given by Levy (2008, p. 6): “Such case studies are often quite brief, and fall short of the degree of detail needed either to explain a case fully or to test a theoretical proposition.”

17.2.2) Hypothetical Illustrative Case Studies (HICS) as Part of DSS Development

In addition to demonstrating how the DSS can be used, the Hypothetical Illustrative Case Studies (HICS) serve the secondary function of helping to improve the DSS itself. When the DSS is applied, even hypothetically, its use is tested. Irregularities could thus be detected, and shortcomings could be identified. This process is not recorded, but it is intrinsically part of the iterative 'learning by building' approach common to pragmatism. At the time that the HICS were written the models were already relatively mature. Few irregularities, and those small, were detected at this stage. A more useful result was the identification of areas where the models could be further developed, especially in terms of User Interface (UI) components.

17.2.3) The Format of the Hypothetic Illustrative Case Studies (HICS)

The two subsections that follow (Chapter 17.3 and Chapter 17.4) provide an overview of two detailed Hypothetical Illustrative Case Studies (HICS1 in Appendix F.1, and HICS2 in Appendix F.2), and are followed by a few examples of how the DSS might be used in other situations (Chapter 17.5). More than one HICS is considered to demonstrate the DSS’s use in more than one setting. Two detailed HICS, as opposed to a series of shorter HICS, are considered as the reader needs to become familiar with each HICS to understand and appreciate how the DSS is utilised in each situation. This is in line with the assertion that efficient use of the DSS requires a good understanding of the situation and operating conditions being considered. Each HICS starts with a description of its characteristics, continues with the narrative itself, and finishes with a short review:

- Characteristics and background: A description of the scenario is given. The user, target audience, industry, status quo of practices, and objective are specifically noted.
- Narrative: The narrative describes how the user could use the DSS in practice, is the scenario. This includes various applications, making use of various facets of the DSS. As the narratives are cumbersome they are not included in the main body of the dissertation, but in the appendices.
- Review: A short summary of what is demonstrated in each subsection.

The HICS will not refer readers to the relevant sections, chapters, figures, tables, or lists for every model, definition, link, node, or reference. This makes the narrative too difficult to follow. The HICS are thus best read with the ‘Rudimentary DSS User Interface – Information Catalogue’ at hand (the information catalogue is not included in this document, its index can be seen in Appendix E).

17.3) Hypothetical Illustrative Case Study 1

This subsection contains an overview of the first Hypothetical Illustrative Case Study.

17.3.1) Characteristics and Background – HICS1

The parameters for HICS1 are as follows:

- User – Owner/Engineering Manager.
- Target Audience – Skilled labour (artisans in a workshop).
- Industry – Manufacturing (small-scale).
- Status Quo of Practices – No formal plan aside from an ad hoc 13th cheque.
- Objective – Increase artisans' level of engagement.

This HICS considers a hypothetical company called SCEW. SCEW is a small engineering works company that designs, builds, and services pressure vessels. Operations are based in a mechanical workshop in an industrial area on the outskirts of a large city. The workshop is manned by a dozen artisans, each with an assistant. Ms Priscilla Vessel, the owner, serves as the engineering manager on site. She is supported by three draftsmen and two administrative staff.

In terms of practices regarding employee incentives no formal plan is in place, aside from a practice of paying employees a '13th cheque' at the end of the year 'if the company performs well'.

Ms P. Vessel is concerned about the low level of overall employee engagement. She recognises that there is considerable potential for increased performance, especially since there is no shortage of work. The premises do not, however, allow for increasing the workforce, and the company is not able to afford new, larger, premises. While the level of engagement could be improved for all employees, the artisans are her main concern.

17.3.2) An Overview of the Narrative for HICS1

An overview of the flow of the narrative for SCEW, as recorded in Appendix F.1.2, is depicted in Figure 17-1:

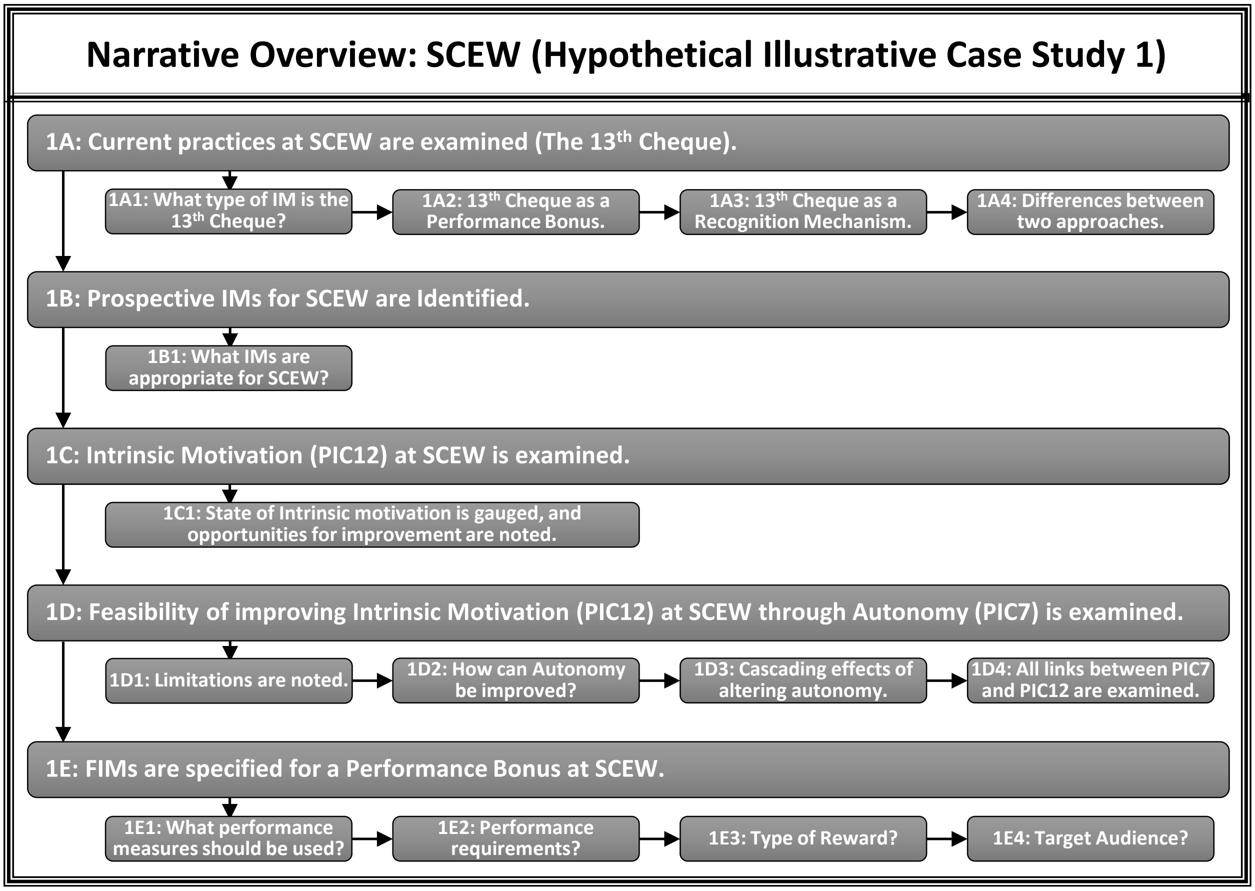


Figure 17-1: The flow of the narrative for SCEW

The complete narrative can be found in Appendix F.1. These 27 pages contain detailed examples that demonstrate how the DSS can be used. A summary of what aspects of the DSS are demonstrated can be found in the review subsection that follows.

17.3.3) Review – HICS1

Figure 17-1 discusses what aspects of the DSS are demonstrated in HICS1, and how this improves decision-making in each subsection of Appendix F.2.1:

Table 17-1: Review of HICS1 – SCEW

Section	Goal	What aspects of the DSS were demonstrated	How decision-making is improved
1A1	• Identify what type an Incentive Mechanism is.	• Node N2 briefly consulted. • CEM2 and CEM5 used to quickly compare two types of IMs.	• An IM can be classified, and an overview can be found, with ease.
1A2 & 1A3 & 1A4	• Ascertain the considerations (threats and opportunities) for two specific mechanisms. • Compare the mechanisms.	• CEM2/CEM5 to find the considerations (threats and opportunities) for two specific IMs. • Link Model FIM→PIC used to find further considerations (threats and opportunities) for two specific IM configurations.	• Considerations (threats and opportunities) of specific IMs can be found with ease.
1B1	• Survey how appropriate the various IMs are in a specific setting.	• CEMs used to gauge how appropriate IMs are in a specific setting.	• Appropriate IMs can be identified with ease.
1C1	• Analyse the state of a PIC and identify Opportunities for Improvement (OFIs).	• ILM Segment 12 was used to ascertain how a PIC is affected by other PICs.	• The factors affecting a specific PIC can be identified with ease.
1D1	• Ascertain limitations.	• Node N1 description for PIC7 used.	• Overview of PIC readily available.
1D2	• Ascertain how a PIC can be improved.	• ILM Segment 7 used to find options.	• Ways of improving a PIC readily available.
1D3	• Understand the cascading effects of modifying a certain PIC.	• ILM Segment 7 used to find the PICs that are affected by a certain PIC, and to understand the links.	• Cascading effects for a specific PIC are readily available, as well as a description of each link.
1D4	• Understand all the links between two PICs.	• Link Model PIC↔PIC used to ascertain all links between two PICs. A part of the future mature UI is used instead of doing it manually.	• All the links between two PICs can be ascertained. This will be automatically available with a mature UI.
1E	• Select the appropriate FIMs for an IM.	• Link Model FIM→PIC is used to understand how each FIM affects the PICs.	• Custom IM design is made easier by understanding how each FIM affects the PICs.

17.4) Hypothetical Illustrative Case Study 2

This subsection contains an overview of the second Hypothetical Illustrative Case Study.

17.4.1) Characteristics and Background – HICS2

The parameters for HICS2 are as follows:

- User – Middle management / Training Program Co-ordinator.
- Target Audience – Professionals in Training (PITs) / Graduate Engineers.
- Industry – Mining/Manufacturing.
- Status Quo of Practices – Various (see below).
- Objective – Evaluate Current Practices and Make Recommendations.

This HICS considers a hypothetical company called LMC. LMC is a large mining company. The focus is on a group called Professionals in Training (PITs). The PITs are graduate engineers during their first few years at LMC. PITs are given various tasks and projects, and assigned to various projects and departments, usually on a short-term rotating bases, to give them the exposure necessary to develop the needed skills and experience. Mr Thomas Rainer, a section engineer at LMC's flagship mine, acts as the training Coordinator for the PITs.

In terms of practices regarding employee incentives various schemes are in place. This includes:

- The company-wide Profit-sharing bonus.
- Merit Pay.
- Recognition Plans.
- Promotions (seen as the primary motivator for PITs).

Mr T. Rainer has been tasked with making recommendations in terms of the practices regarding employee incentives for PITs.

17.4.2) An Overview of the Narrative for HICS2

An overview of the flow of the narrative for LMC, as recorded in Appendix F.2.2, is depicted in Figure 17-2:

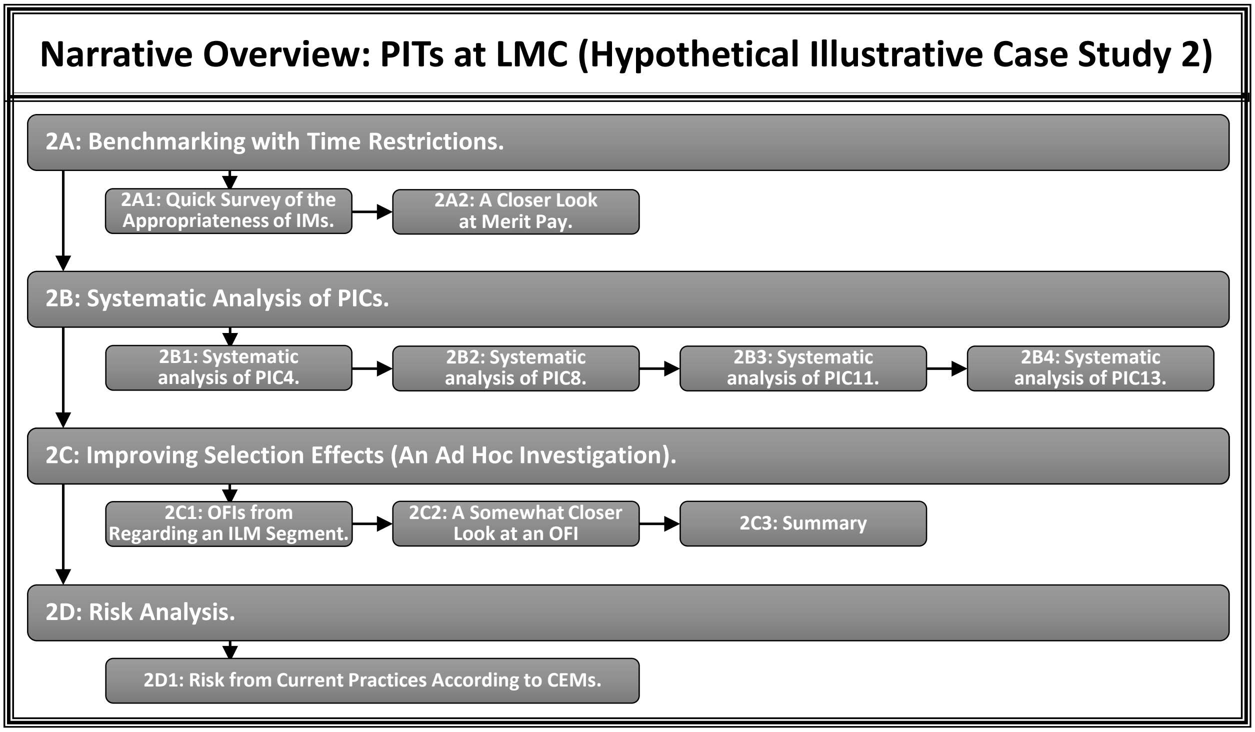


Figure 17-2: The flow of the narrative for PITs at LMC

The complete narrative can be found in Appendix F.2. These 28 pages contain detailed examples that demonstrate how the DSS can be used. A summary of what aspects of the DSS are demonstrated can be found in the review subsection that follows. The narrative duplicates some of the material in HICS1 (Appendix F.1); this is done to maintain HICS2's (Appendix F.2) readability.

17.4.3) Review – HICS2

Figure 17-2 discusses what aspects of the DSS are demonstrated in HICS2, and how this improves decision-making in each subsection of Appendix F.2.2:

Table 17-2: Review of HICS2 – LMC

Section	Goal	What aspects of the DSS was demonstrated	How decision-making is improved
2A1	• Survey how appropriate the various IMs are in a specific setting.	• CEMs used to gauge how appropriate IMs are in a specific setting.	• Appropriate IMs can be identified with ease.
2A2	• Determine whether a specific IM is appropriate.	• CEM4.1 for a summary and characteristic links. • Link Model FIM→PIC used to find further considerations (threats and opportunities).	• A summary of the Pros and Cons of a specific IM is derived.
1B	• Identify Opportunities for Improvement (OFIs). • Identify unhealthy PICs.	• The ILM Segments.	• Course of action can be decided as Opportunities for Improvement are identified (OFIs). • Important links for specific PICs in current setting is highlighted.
2C1	• Quickly identify OFIs for a specific PIC.	• Quick use of an ILM Segment.	• OFIs can be identified quickly.
2C2	• Pros and Cons as well as feasibility check.	• CEM's summary of pros and cons	• Quick identification of pros and cons.
2D1	• Identify risk associated with current practices	• CEM's function of highlighting Threats	• Provides a way for users to quickly identify risks.

17.5) Further Examples

This subsection contains examples of how the DSS might be used in other situations.

The two Hypothetical Illustrative Case Studies (HICS) demonstrate various uses for the DSS in two scenarios. Various other scenarios or situations exist in which the DSS could provide assistance or be used in some manner. This is not to say that all the uses in HICS1 (Appendix F.1) and HICS2 (Appendix F.2) apply to every situation, or that only those uses exist. Most of the uses in HICS1 and HICS2 could be applied to most of the situations that are listed below. Various other applications of the DSS could also be made in the examples of situations that follow, as well as in the HICS themselves. The purpose of the examples that follow are thus to highlight some other situations in which the DSS might be used. The uses demonstrated in HICS1 and HICS2 will not be repeated for these examples.

17.5.1) Example 1: Farming

Small-scale or commercial farmers could use the DSS in relation to employees such as labourers, foremen, and farm managers. The user could be an owner or a farm manager. As most farmers have practices in place, official or unofficial, the primary use would be an analysis of the status quo to identify Opportunities for Improvement (OFIs), or to become aware of the risks associated with current practices. Other uses could include designing or identifying alternative Incentive Mechanisms (IMs).

17.5.2) Example 2: Consulting Companies

Both large and small consultancy companies could use the DSS in relation to junior employees or middle managers. The DSS user could be in upper management, HR, or middle management. As companies are almost certain to have practices in place, the primary use would be an analysis of the status quo to identify OFIs or to become aware of the risks associated with current practices. Other uses could include diagnosing known problems.

17.5.3) Example 3: Mining Companies (and other large industrial organisations)

Mining companies could use the DSS in relation to a wide range of employees such as section managers, middle managers, foremen, artisans in workshops, truck drivers, maintenance personnel, operations personnel, logistic departments and support staff. The DSS user could be upper management, middle management, or even foremen (though regulative limitations would exist). Existing practices would almost certainly be in place. The primary use would be an analysis of the status quo to identify OFIs or to become aware of the risks associated with current practices. Other uses could include diagnosing known problems and identifying IMs or Elements of Job Design (EJD) that could be used as mitigation or optimisation.

17.5.4) Example 4: Restaurants (Service industry)

While the DSS is not focused on the service industry at this stage, it can still be of assistance as it is principle-driven. Large restaurants, for example, could use the DSS in relation to front-end employees, kitchen staff, or the restaurant manager. The user could be the owner or the manager. As most undertakings have practices in place, official or unofficial, the primary use would be an analysis of the status quo to identify OFIs or to become aware of the risks associated with current practices. Other uses could include designing or identifying alternative IMs.

17.5.5) Example 5: Insurance Providers (Retail industry)

While the DSS is not focused on the retail industry at this stage, it can still be of assistance as it is principle-driven. Insurance providers, for example, can use the DSS in relation to agents, telephonic marketers, or branch managers. The user could be upper management or branch managers. As most undertakings have practices in place, official or unofficial, the primary use would be an analysis of the status quo to identify OFIs or to become aware of the risks associated with current practices. Other uses could include designing or identifying alternative IMs.

17.6) Summary

This subsection concludes Chapter 17: Demonstration.

It would seem natural to conclude this demonstration chapter with a review or analysis of what has been demonstrated. As the verification chapter specifically considers whether the research requirements have been met, it is appropriate to review or analyse what has been demonstrated in relation to the research and design requirements. The demonstration chapter will thus not conclude with a detailed review or analysis. This flows into the verification chapter that follows.

Nevertheless each Hypothetical Illustrative Case Study (HICS) concludes with a short review of what has been demonstrated in each subsection, and how decision-making was improved. In short the HICS demonstrate:

- The DSS can be used to identify what type of Incentive Mechanism (IM) a specific IM is (1A1).
- The DSS can be used to analyse IMs for threats and Opportunities for Improvement (OFIs) (1A2, 1A3, 2C2).
- The DSS can be used to survey how appropriate IMs are for a specific setting (1B1, 2B1).
- The DSS can also be used for a detailed analysis with more time (2B2).
- The DSS can be used to analyse the state of a PIC (1C1, 2B3, 2B4).
- The DSS can be used to identify OFIs for a specific PIC (1C1, 1D1, 2B1-4, 2C1).
- The DSS can be used to understand a PIC more fully (1D1).
- The DSS can be used to understand the cascading effects of modifying a specific PIC (1D3).
- The DSS can be used to ascertain all the links between two PICs (1D4).
- The DSS can be used to select the appropriate features for a specific IM (1E).
- The DSS can be used to perform a risk analysis on current practices (2D1).

The demonstration helps users to understand the various ways the models can be used to help with decision-making.

On a high level the DSS:

- Makes users aware of the 13 PICs.
- Helps users to understand how the typical IMs interact with the PICs.
- Helps users to be aware of the Element of Job Design (EJD) that could be used to improve the PICs or the use of IMs.
- Can be used to better understand a PIC or IM.
- Can be used to find OFIs.
- Can be used to find risks or dangers.
- Helps users to understand the cascading effects of decisions.

Chapter 18: Verification and Validation

"It is the mark of an educated mind

to be able to entertain a thought without accepting it."

-Aristotle

18.1) Introduction

This subsection introduces Chapter 18: Verification and Validation.

With the DSS development complete (SECTION B, C, and D) and a demonstration of how the DSS can be used available (Chapter 17 and Appendix F), verification and validation can be done. The purpose of verification and validation is as follows:

- Verification shows that the solution meets the solution requirements.
- Validation shows that the solution accomplishes its intended purpose.

The purpose of the verification phase is to check that the research, and the DSS specifically, meets the requirements that were specified to satisfy the research objectives. The purpose of the validation phase is to validate that the research has satisfied the specified objectives. This phase is not the beginning of the validation of the research or the DSS, but the final step. Alternatively this phase can be thought of as external validation. Various phases of internal validation have been required in the course of the design of the DSS. Each sub-model, or iteration of a sub-model, was subject to an internal evaluation. This included theoretical role playing and third-party feedback. The culmination of the sub-models, the DSS, was similarly evaluated. The demonstration of the DSS in the Hypothetical Illustrative Case Studies (HICS) in Chapter 17 and Appendix F serves as a further validation. The design of the DSS can be described as consisting of a series of design-evaluate-design-evaluate iterations.

Chapter 18 starts by verifying that the research and the final artefact, the DSS, met the determined requirements or specifications. This is followed by externally validating whether the research, specifically the DSS, accomplished its intended purpose. This chapter is structured as follows:

- Chapter 18.1) Introduction
- Chapter 18.2) Verification
  - Verification that the developed DSS meets the determined requirements or specifications.
- Chapter 18.3) Validation Approach
  - An overview of the validation approach is provided and the appropriate validation technique is selected.

- Chapter 18.4) Designing the Expert Interviews
    - Expert interviews are discussed. This includes specific considerations, the interview process, and the questionnaire.
- Chapter 18.5) Expert Interviews – Results and Discussion
    - An overview of the results from the expert interviews is provided and the findings are discussed.
- Chapter 18.6) Summary

18.2) Verification

This subsection verifies that the developed DSS meets the determined requirements or specifications.

This subsection verifies whether the research, and the DSS specifically, met the determined requirements or specifications. The completion of the DSS and its components, the Knowledge Base (KB), Model Base (MB), and User Interface (UI), as well as the demonstration chapter, provided the necessary material for verification purposes. Note that the research's approach can be broken up into three phases; 1) a primary objective and further solution objectives were derived from the problem statement, 2) a specific DSS configuration was specified that satisfied the primary objective and solution objectives, and 3) the DSS was developed. Considering these phases elucidates what needed to be considered during the verification exercise:

1) The primary objective was derived from the problem statement as outlined in Chapter 1.4. The additional solution objectives were derived from the primary objective as recorded in Chapter 4. No verification was required.
2) In light of the problem statement and solution objectives the DSS functionality and design specifications were determined. A DSS configuration was specified that met these objectives. This process, including an internal verification of the suitability of the specified DSS, can be found in Chapter 3. No further verification was required.
3) The DSS was developed according to the configurations specified in point 2 above: "A knowledge-driven personal Decision Support System that acts in an advisory capacity and is composed of a Knowledge Base, Model Base, and User Interface." The following verification steps were required:
    - (I) Does the developed DSS meet the requirements native to the specified DSS configuration?
        - (Ia) Is the DSS knowledge-driven?
        - (Ib) Can the DSS function as a personal Decision Support System?
        - (Ic) Can the DSS function in an advisory capacity?
        - (Id) Does the DSS contain a KB, MB, and UI?
            - (Idi) Does the developed KB meet the KB specifications from the DSS literature?
            - (Idii) Does the developed MB meet the MB specifications from the DSS literature?
            - (Idiii) Does the developed UI meet the UI specifications from the DSS literature?
    - (II) Does the developed DSS satisfy the DSS functionality and design specifications from Chapter 3.2.4? (Cross-checks verification done in Phase 2).
    - (III) Does the developed DSS satisfy the solution objectives and primary objective? (A high-level cross-check of derivations from 'solution objectives' to 'DSS functionality and design specifications' to 'DSS configuration' to 'developed DSS'.)

A. (Additionally) It has been discussed (see Chapter 1.3.3.3) that the purpose of the research and artefact could be described as increasing the usability and relevance of knowledge to users for decision-making purposes:

- (IV) Does the research, specifically the developed DSS, increase the usability and relevance of knowledge to users for decision-making purposes?

Table 18-1 addresses the verification requirements listed above:

Table 18-1: Verification in light of DSS specifications, artefact requirements, and solution objectives

I: Is the developed DSS in line with the specified DSS?		
DSS Specifications	**Discussion**	
Ia) Knowledge-Driven (Primarily), and Model-Driven (supplementary).	As is characteristic of a Knowledge-Driven DSS (see Chapter 3.4.1.2) the developed DSS's problem-solving expertise consists of knowledge about a particular domain and an understanding of problems within that domain. This knowledge is formulated into models that can be used to aid decision-makers in analysing a situation. Notice specifically the identification and description of the 13 PICs, Incentive Mechanisms (IMs), and Elements of Job Design (EJD), as well as the information describing the relationship or interaction between various PICs, IMs, and EJD; this knowledge can certainly be seen as 'driving the DSS'.	✓
Ib) Personal Decision Support Systems (PDSS)	The developed DSS is suitable for use by a single user in such a manner that it can support a decision task. The DSS does not require information, expertise, or resources that are not available to prospective users (assuming users are competent in their specific domains).	✓
Ic) Advisory System	The developed DSS does not propose concrete decisions, but rather empowers the decision-maker in the decision-making process, while leaving the final decision to the human user.	✓
Id) Does the DSS contain a KB, MB, and UI? — Do the developed KB, MB, and UI, meet the specifi-cations from the DSS literature?	The developed DSS contains an elaborate KB and MB, and rudimentary UI. • The KB consists of the 13 PICs (see II11 below), IMs, EJD, and a description of the numerous links between them. • The MB contains models showing: Links between PICs, links between PICs and IMs, IMs and Features of Incentive Mechanisms (FIMs), PICs and FIMs, IMs and EJD, and PICs and EJD. • The UI includes the graphical representations of the MB, the ILMs, and the CEMs. These components are able to satisfy their basic purposes as described by the DSS literature. This is further verified in 'II' below.	✓
I) Conclusion: The developed DSS satisfies the specified DSS specifications. While some internal verification has been done to ensure the specified DSS can meet the functionality and design requirements (see Chapter 3.4.2), it is more robust to verify whether the developed DSS satisfies these requirements. This is done below in 'II'.		
II: Does the developed DSS satisfy the DSS functionality and design specifications?		
Required Functions	**Discussion**	
II1) The artefact must be able to make users aware of the important considerations that have to be taken into account with regards to practices	The KB contains the required information in the form of the 13 PICs. This is communicated in the MB and UI. Note that in order to make the user aware of the 'important considerations' the research had to identify considerations, and isolate the ones that are important. Without this distinction information overload would inhibit users being	✓

involving employee motivation and incentives.	aware of the important considerations. The process used to identify the 13 PICs must thus be reliable enough for the DSS to 'make users aware of the most important considerations'. See II11 below and Chapter 5.	
II2) The artefact must be able to make users aware of the mechanisms that can be used to influence the above mentioned considerations.	The DSS contains the required information in the form of the IMs and EJD (Chapter 6 and 7). This is communicated in the MB and UI.	✓
II3) The artefact must be able to help users understand how the mechanisms influence the considerations.	The DSS contains links that describe the relationships between PICs and IMs, PICs and FIMs, and PICs and EJD. This is recorded and communicated in the MB and UI. See SECTION C and D (Link Models and Lists specifically) and Hypothetical Illustrative Case Studies (HICS) items 1C1, 1D2, 2B, and 2C1 (Chapter 17 and Appendix F).	✓
II4) The artefact must instruct users that the considerations are not isolated, but part of an integrated system, and hence has links between them.	In addition to the links listed in 'II3' above the DSS also contains links between the 13 PICs themselves, between IMs and EJD, and IMs and FIMs. The information is presented in such a way, as with the Integrated Links Model (ILM) and the Cascading Effects Models (CEMs), that users should come to understand that none of the links operates in isolation. Each action has cascading effects. This is further emphasised with the complex spiderweb conceptualisation (see Chapter 13.2).	✓
II5) The artefact must be able to help users understand the links between the considerations.	The DSS describes the links between the 13 PICs. This is communicated in the MB and UI. Note also the discussion for 'II3' and 'II4' above. See Chapter 9.	✓
II6) The artefact must be able to help users understand the cascading effects, or pros and cons, of applying a specific mechanism.	The DSS contains the necessary information and communicates this in the MB and UI, specifically through the CEMs, but also with the ILM and other Link Models. See Chapter 15 (CEMs) and the HICS items 2A2, 2C2, 1D3, and 1D4 (Chapter 17 and Appendix F).	✓
II7) The artefact must be able to help users identify opportunities for improving existing practices.	The DSS contains the necessary information and communicates this in the MB and UI, specifically through the ILM, but also with the CEMs and other base models. See Chapter 14 (ILM) and the HICS items 1D2, 2B, and 2C1 (Chapter 17 and Appendix F).	✓
II8) The artefact must be able to help users identify risks, threats, or dangers associated with existing practices.	The DSS contains the necessary information and communicated this in the MB and UI, specifically through the CEMs, but also with the ILM and other Link Models. See Chapter 15 (CEMs) and the HICS items, specifically 2D, as well as 1A2, 1A3, and 2C2 (Chapter 17 and Appendix F).	✓
II9) The artefact must be able to help users assess current practices.	The DSS can be used to gauge the suitability of current practices. The DSS contains information, specifically in the links, that helps users to understand what mechanisms are suitable in different situations. See the HICS items 1B1, 1C1, 1E, 2A1, and 2B (Chapter 17 and Appendix F).	✓

II10) The artefact must be able to help users in the design of new mechanisms.	The DSS helps users design new mechanisms by outlining various IMs and EJD, and helps them to understand how these mechanisms affect the PICs. Furthermore the isolation of the FIMs helps users to understand how various features of IMs affect the PICs. See HICS item 1E specifically, as well as 1B1, and 2A1 (Chapter 17 and Appendix F).	✓
II11) The artefact must be reliable.	Since the DSS is knowledge-driven, the quality of the Knowledge Base is imperative when DSS reliability is considered. The 13 PICs are central to the KB and thus to the reliability of the DSS. It is for this reason that a detailed structured literature review was designed and conducted to identify the PICs. This process is reliable (Chapter 5), hence the PICs are accepted as reliable. The development of the artefact was done in a transparent manner and closely related to the findings of the structured literature review as detailed in SECTION B and C.	✓
II12) The artefact must be easy to use.	The UI and MB are designed to make the information in the KB usable to users. This is shown in the demonstration chapter (Chapter 17 and Appendix F). It should be noted that even the KB is tailored to improve ease of use. Its core function is to isolate the most important considerations from an overwhelming amount of information.	✓
II13) The artefact must be able to be used for detailed analysis if required.	The DSS's KB can be consulted, and used alongside the MB, to study various concepts in detail. This is illustrated by the HICS as a whole. See HICS item 1D4 (Appendix F.1) for a specific illustration.	✓
II14) The artefact must treat organisations as complex systems.	The DSS does not consider individuals or units in an organisation in isolation. This is inherently driven by the theory underlying the 13 PICs. It is evidenced by the PICs and links themselves, as well as by the cascading effects resulting from the interconnected nature of the models.	✓
II) Conclusion: The functional requirements, which flow from the primary objective and solution objectives, are satisfied by the developed DSS. Taking a step back, 'III' below verifies that this developed DSS meets the high-level solution objectives and primary objective.		
III) Does the developed DSS satisfy the solution objectives and primary objective?		
Solution Objectives	**Discussion**	
Functional Specification: The artefact must function as a DSS.	As discussed in 'I' above, the artefact has the characteristics of a DSS. Recall that DSS functionality was selected because an artefact was required that could improve decision-making in terms of quality and speed. The developed DSS satisfies these requirements as discussed in 'II' above.	✓
Technical Specifications: The Artefact must include a KB, MB, and UI.	The DSS includes a KB and MB, and a basic UI as discussed in 'Id' above. The design of these components satisfies their required functions as discussed in 'II' above.	✓
Scenario-based specifications: The artefact is to be used in relation to improving an	The DSS is able to operate in organisations. This flows from the domains the KB is sourced from, the background the MB is	✓

organisation's practices regarding employee incentives.	designed against, and is illustrated in the demonstration (Chapter 17 and Appendix F).	
Primary Objective: Develop a Decision Support System that can be used to improve an organisation's employee incentives practices.	The developed DSS is able to improve decision-making both in terms of quality and speed. The 13 PICs, which form the core of the KB, identify the most important considerations that have to be taken into account with regards to employee incentives. Users are further helped to understand the PICs and how they can be influenced. This knowledge is modelled and presented in such a way that useful insights can be extracted with time limitations.	✓
III) Conclusion: The developed DSS meets the solution objectives and primary objective.		
A) Does the developed DSS increase the usability and relevance of knowledge to users for decision-making purposes?		
Yes, to a significant degree. The summation of the PICs greatly increases the usability and relevance of knowledge by identifying and isolating the most important considerations from what can be an overwhelming amount of information, especially to non-experts. The DSS further improves the usability of the PICs by integrating them into an extended model that explains how they are related to one another and various mechanisms that can be used to influence them. Usability is further improved with the design of a rudimentary UI.		✓

This subsection verifies that the research and the final artefact, the DSS, satisfy the research specifications. This is done on both a high level, and against secondary functional requirements. The validation that follows considers whether satisfying the specifications has achieved its intended purpose.

18.3) Validation Approach

This subsection provides an overview of the validation approach and selects the appropriate validation technique.

In order to design a meaningful and effective validation process there needs to be clarity apropos what is to be validated. Recall that pragmatism has been selected as the research paradigm. It follows that the value of the research is determined in terms of usefulness (Barger, 2001). Note also that the research itself can be divided into two parts. Firstly, a structured literature review was conducted to build the Knowledge Base (KB). Secondly, this knowledge was used as the foundation of the DSS, it is the bedrock that the Model Base (MB) and User Interface (UI) are built upon. The structured literature review is systematic and objective, it tends to the positivist domain and is internally validated[7]. The development of the DSS was done in a transparent manner and closely related to the findings of the structured literature review as detailed in SECTION B and C. It follows that the validation in this subsection should focus on the DSS as a solution; does the designed DSS address the research problem in a satisfactory manner? While this is illustrated in the demonstration (Chapter 17 and Appendix F), validating the Hypothetical Illustrative Case Studies (HICS) strengthens the assertion. While the consistency of the development of the MB in relation to the KB can be observed in SECTION B and C, the process relies on constructivism. Further evidence was thus pursued to strengthen the validity.

A range of validation techniques exist that might be appropriate for further validation. Some approaches that were considered included physical testing (A), theoretical demonstration (B), and external authority (C):

- Option A, physical testing, is not suitable: One approach would be to apply the DSS and measure changes in employee engagement. This would entail measuring employee engagement with a tool such as Gallup's Q^{12}/The Gallup Workplace Audit/GWA (Harter, Schmidt, Killham, & Asplund, 2009), implementing the DSS, and measuring employee engagement again after a set period. The difficulties are, however, numerous. Firstly, employee engagement is not directly equivalent to the purpose of the DSS (increasing employee engagement and principle-agent goal alignment). Some scenarios might be construed, such as applying the DSS to front-line managers and gauging increased performance through front-line employee engagement. Secondly, various outside influences could affect any such measurement, the amount of noise would be excessive and limit the reliability of any findings. Thirdly, a study of this nature would have to be longitudinal; this amplifies the second-difficulty. To summarise, the difficulty with performance measures, the uncontrollable and often difficult-to-identify external influences, and the time required, prohibit the use of physical testing as a means of validation.
- Option B, theoretical demonstration, is suitable: The theoretical demonstration can consider a hypothetical situation or an existing situation. The demonstration (Chapter 17 and Appendix F)

[7] It can also be noted that the process and findings of the structured literature review recorded in Chapter 5 produced an article that was published prior to the final compilation of this dissertation:

- ❖ Loots, E., & Schutte, C. S. (2016). Primary incentive plan design considerations according to a review of key influential works. *Engineering Management Journal, 28*(4), 224-237.

describes various ways that the DSS can be used in two Hypothetical illustrative Case Studies (HICS). This is evidence of the validity of the DSS. In addition to HICS, workshops can be used to demonstrate how the DSS can be used in existing situations. Note that demonstrations, whether in hypothetical or existing situations, give evidence of the validity of the DSS, yet there is a qualitative nature to the evidence. In summary, theoretical demonstrations give evidence of the validity of the DSS, but might not be persuasive enough on their own.

- Option C, external authority, is suitable: This approach is fitting when claims that are hard to demonstrate quantifiably need to be validated. Techniques such as questionnaires, interviews, and workshops are typically utilised. As the validation is only as convincing as the validating source, the source or validator(s) should possess the necessary authority. One-on-one interviews with experts was selected as the most appropriate approach. The required 'authority' is thus sourced from a limited group of individuals whose commentary carries much weight, as opposed to a large group of individuals whose opinions carry little weight. In this situation even the combined opinion of numerous non-experts would not be convincing as an in-depth understanding of the domain is required to discern whether the DSS is able to satisfy the required functionality in a reliable manner, and to discern whether the required functionality satisfies the problem statement.

While the various aspects that contribute towards the validation might not be convincing in isolation, they are persuasive when considered in conjunction with one another. Not in the sense of triangulation as a means of validation as discussed by proponents of mixed-method research (Torrance, 2012), but rather in a layered or additive sense as follows:

1) It can be validated that the objective structured literature review process is sound and should yield reliable results. The process used to build a model from these results is transparent and can be scrutinised. Hence the DSS can be argued to be reliable, based on the process used to develop it.
2) The reliability and functionality of the DSS is further validated through demonstration (albeit theoretically, in a hypothetical situation).
3) Functionality and reliability are once again validated by external experts. This involves validating the HICS's demonstrations of point 2, and considering further examples in workshops. At the same time the theory and model-building of point 1 are checked.

The final validation step is thus one-on-one expert interviews. As discussed in option C, these validators need to possess the necessary authority to be persuasive. While no specific requirements were specified for selection purposes, the experience, qualifications, knowledge and reputation of the individuals should be of such a calibre that their commentary is persuasive enough for external validation purposes.

18.4) Designing the Expert Interviews

This subsection describes the details involved with the expert interviews. This includes specific considerations, the interview process, and the questionnaire.

18.4.1) Considerations

In order to obtain the necessary feedback from interviewees they needed to be provided with sufficient details; experts typically operate under considerable time restrictions. The presentation and demonstration was thus configured to be as concise and precise as possible, while still providing the necessary information and demonstrations to enable interviewees to provide feedback. The risk of interviewees giving feedback without sufficient understanding is mitigated by providing and emphasising an opt out option for every question (i.e. "No answer, more information required", see Table 18-3). The restrictions and requirements for the expert interviews are discussed in more detail below.

The restrictions that the expert interviews had to accommodate, mainly due to the type or nature of individuals who are to be interviewed, were as follows:

- Time restrictions: In order to gain access to the required experts the interviews had to be able to be conducted in a slot that did not exceed two hours. One-hour meetings would have been easier to arrange, but would not have allowed sufficient time to provide the necessary information. Some aspects of the interview could be designed in such a manner that they are expandable when time allows. Two examples are the 'interactive demonstration' (demonstration of the DSS in the expert's workplace or situation), and the 'further feedback/discussion' items.
- Availability restrictions: As it can be difficult to arrange meetings with experts, who are typically busy individuals, the interviews were conducted on a one-on-one basis. The nature of the expert interviews does favour one-on-one interviews.
- Preparatory material: As experts are busy individuals and under no obligation to assist the researcher, the scope for interview preparation is restricted. The decision was thus taken to design interviews in such a manner that no preparation was required on the part of the experts. This is not a problem as the DSS, according to the solution objectives, should be able to be used under time restrictions.

In summary, the expert interviews had to be able to be conducted in a two-hour meeting slot, on a one-on-one basis, with no preparation on the part of the expert.

In order for the experts to provide the required feedback, certain conditions had to be met within the restrictions listed above:

- Background:
    - The experts must understand the problem statement and solution objectives.
    - The experts must understand how the DSS was designed.
    - The experts must understand how the DSS is intended to function.
- Exhibition:
    - The use of the DSS must be demonstrated to the experts.

- The experts must have an opportunity to investigate and scrutinise the DSS.

- Feedback:
  - Sufficient time must be made available to collect the required feedback.

18.4.2) The Interview Process

The considerations above were satisfied with the following three interview phases:

1) A presentation: This phase communicated enough information so that the demonstration could commence. Note that while a clear background and explanation of what the DSS is, and how it works, was required, the theoretical details of the DSS did not need to be relayed at this stage. While the experts had a chance to examine and comment on how the DSS 'thinks', the Knowledge Base (KB) is primarily validated through the structured literature review.
2) A demonstration: This phase had to convince the experts that the DSS is able to do what is required of it. Two sub-phases were utilised:
   a. Fixed demonstration: A demonstration based on the Hypothetical Illustrative Case Studies (HICS from Chapter 17 and Appendix F) was used to demonstrate various ways the DSS can be used.
   b. Interactive demonstration: The DSS can be applied to the expert's workplace or situation in a workshop-like manner. Depending on the time the expert had available, and the expert's interest, this exercise was relatively open-ended.
3) Feedback: The last phase is where the feedback was collected from the experts. This included a questionnaire that sought to validate the claims made in the verification subsection (Chapter 18.2), and give experts space for further feedback. Further feedback was not limited to the questionnaire, but included verbal feedback and relevant discussions.

The three interview phases are outlined, with time allocations, in Table 18-2:

Table 18-2: The Interview Process

	Steps	Time
Phase 1 (Presentation)	A) Problem Statement and Background B) Solution: The purpose of the DSS C) KB: The systematic literature and the PICs D) MB: The models E) UI: Interacting with the Rudimentary DSS F) Towards a Mature UI G) DSS: Summary of Purpose and Functionality	30 mins
Phase 2 (Demonstration)	A) Fixed Demonstration: i) Familiarisation with nodes ii) A closer look at a specific IM – Merit Pay iii) Identifying OFIs, and gauging PIC health – Perceived Competence iv) Quick Risk analysis – Merit Pay	40 mins
	B) Interactive Demonstration*	10-30 mins
Phase 3 (Feedback)	A) Questionnaire B) Further Feedback/Discussion*	10-30 mins

*These items are open-ended to the satisfaction of the expert.

The presentation and demonstration are not provided for brevity's sake. The arguments and material in the presentation mirror this document. The demonstration is extracted from the demonstration chapter (Chapter 17 and Appendix F). The questionnaire has not been introduced or discussed, and can be found in the subsection that follows.

18.4.3) The Questionnaire

The questions or statements utilised by the questionnaire have their origin in the research questions, as reflected in the solution objectives, and addressed in the verification subsection (Chapter 18.2). Experts were also queried for any additional feedback or insights above and beyond those discussed during the interview.

Both open and closed questions have advantages and limitations (Fink, 2003). As time limitations were present the questionnaire utilised closed-ended questions to garner the essential feedback. Unanticipated insights and feedback were, however, also sought. Each question was thus accompanied by an opportunity to provide further comments or feedback, and the questionnaire finished with a set of open-ended questions. A Likert Scale was selected as a proper technique for the closed-ended questions (SurveyMonkey, 2016). The closed-ended questions could be configured in various ways. According to the guidance provided by Fink (2003) and SurveyMonkey (2016) the following configurations were selected:

- The response type is endorsement, as opposed to frequency, intensity, influence, or comparison.

- A neutral response option was not provided on the scale. There is no conclusive evidence on the superiority of odd- or even-numbered limitations (Fink, 2003). A neutral category is thus not mandatory. While a neutral category was not provided, there was an option not to answer the question, when the respondent felt unable to do so due to a lack of information. This removes the risk of interviewees opting for a neutral answer when they did not have enough information to make a decision.
- A 6-point scale was selected, and accompanied by a visual aid.
- The negative end of the scale was presented first.
- The questionnaire was designed to fit onto a double-sided page, with the Likert scale on one side and additional feedback on the other side.

In addition to the Likert scale and open-ended questions, interviewees were questioned regarding their net promoter score (Reichheld, 2003). The net promoter score of a business gives an indication of customer loyalty. This is established by questioning customers how likely they are to recommend the business, brand, or offering to a friend, colleague, or relative on a scale ranging from 1 (very unlikely) to 10 (very likely); 0-6 indicates detractors, 7-8 indicates passives, and 9-10 indicates promoters. The net promoter score is essentially a loyalty metric, but does provide some indication of the perceived quality or value of an offering. While the number of responders was not sufficient to calculate statistically reliable scores, the responders' answers give an additional indication of the usability and relevance of the DSS specifically. This question will be asked in relation to the rudimentary DSS, and the mature DSS. While the rudimentary DSS is not expected to be ready for external use, the mature DSS should receive favourable ratings.

The final questionnaire can be seen on Table 18-3 and Table 18-4. It shows the questions themselves, as well as the configuration and visual design. This final version was refined and tested internally before the expert interviews were conducted.

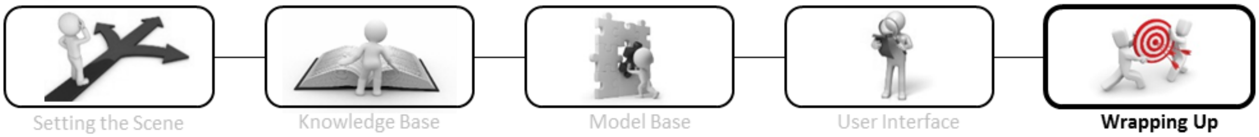


Table 18-3: Validation Questionnaire – Likert Scale

Validation Questionnaire: To what extent do you agree with the following questions?									
Example	*E – The DSS's user interface is well developed.*	*Disagree Strongly*	*Disagree Moderately*	*Disagree Slightly*	C *Agree Slightly*	*Agree Moderately*	M *Agree Strongly*		*No answer, more information required*
		Further comments: The "M" is only required when the development of a mature user interface would materially alter the answer.							
Purpose	*1 – The DSS addresses an existing need.*	*Disagree Strongly*	*Disagree Moderately*	*Disagree Slightly*	*Agree Slightly*	*Agree Moderately*	*Agree Strongly*		*No answer, more information required*
		Further comments:							
Performance	*2 – The DSS can be used to improve practices regarding employee incentives.*	*Disagree Strongly*	*Disagree Moderately*	*Disagree Slightly*	*Agree Slightly*	*Agree Moderately*	*Agree Strongly*		*No answer, more information required*
		Further comments:							
	3 – The DSS improves decision making in terms of quality.	*Disagree Strongly*	*Disagree Moderately*	*Disagree Slightly*	*Agree Slightly*	*Agree Moderately*	*Agree Strongly*		*No answer, more information required*
		Further comments:							
	4 – The DSS improves decision making in terms of speed.	*Disagree Strongly*	*Disagree Moderately*	*Disagree Slightly*	*Agree Slightly*	*Agree Moderately*	*Agree Strongly*		*No answer, more information required*
		Further comments:							
	5 – The DSS is easy to use, i.e. it can be used by non-experts.	*Disagree Strongly*	*Disagree Moderately*	*Disagree Slightly*	*Agree Slightly*	*Agree Moderately*	*Agree Strongly*		*No answer, more information required*
		Further comments:							
Setting	*6 – The DSS is suitable for use in organisations where individuals, groups, or work units, form a complex integrated system.*	*Disagree Strongly*	*Disagree Moderately*	*Disagree Slightly*	*Agree Slightly*	*Agree Moderately*	*Agree Strongly*		*No answer, more information required*
		Further comments:							
Functionality	*7 – The DDS is able to make users aware of the most important considerations.*	*Disagree Strongly*	*Disagree Moderately*	*Disagree Slightly*	*Agree Slightly*	*Agree Moderately*	*Agree Strongly*		*No answer, more information required*
		Further comments:							
	8 – The DSS can be used to assess current practices.	*Disagree Strongly*	*Disagree Moderately*	*Disagree Slightly*	*Agree Slightly*	*Agree Moderately*	*Agree Strongly*		*No answer, more information required*
		Further comments:							
	9 – The DSS can be used to identify opportunities for improvement.	*Disagree Strongly*	*Disagree Moderately*	*Disagree Slightly*	*Agree Slightly*	*Agree Moderately*	*Agree Strongly*		*No answer, more information required*
		Further comments:							
	10 – The DSS can be used to identify threats/dangers/risks.	*Disagree Strongly*	*Disagree Moderately*	*Disagree Slightly*	*Agree Slightly*	*Agree Moderately*	*Agree Strongly*		*No answer, more information required*
		Further comments:							

Table 18-4: Validation Questionnaire – Additional feedback and comments

<table>
<tr><th colspan="12">Additional Feedback and Comments</th></tr>
<tr><td colspan="2">11 – Have you used any tools that could fulfil the role of the DSS, even if only in part? If so, what tools?</td><td colspan="10"></td></tr>
<tr><td colspan="2" rowspan="4">12 – How likely would you be to recommend the DSS to friends, colleagues, or acquaintances who are involved with the design or optimisation of employee incentive practices?</td><td colspan="10">With the current user interface:</td></tr>
<tr><td>1</td><td>2</td><td>3</td><td>4</td><td>5</td><td>6</td><td>7</td><td>8</td><td>9</td><td>10</td></tr>
<tr><td colspan="10">With a mature user interface:</td></tr>
<tr><td>1</td><td>2</td><td>3</td><td>4</td><td>5</td><td>6</td><td>7</td><td>8</td><td>9</td><td>10</td></tr>
<tr><td>13 – Regarding shortcomings: It would be helpful if the DSS….</td><td rowspan="2">While feedback surrounding the current or mature UI are welcome, consider also the DSS as a whole (Functionality, Approach, Knowledge/Model Base, etc.)</td><td colspan="10"></td></tr>
<tr><td>14 – Regarding concerns: I am concerned that the DSS…</td><td colspan="10"></td></tr>
<tr><td colspan="2">15 – Additional feedback or comments:</td><td colspan="10"></td></tr>
</table>

18.5) Expert Interviews – Results and Discussion

This subsection provides an overview of the results from the expert interviews and discussed the findings.

This subsection is structured as follows:

- 18.5.1) The Interviewees – An overview of the credentials of the interviewees is provided.
- 18.5.2) Interview Data and Appraisal – Feedback is documented alongside a brief appraisal.
- 18.5.3) Results and Discussion – Results are extracted and discussed.
- 18.5.4) Summary – A summary of the findings.

18.5.1) The Interviewees

As the expert interviews rely on the authority of the interviewees, care was taken to select appropriate individuals. Individuals with the necessary expertise were difficult to identify, and difficult to set appointments with, as they are typically busy individuals. It could thus be said that a mixture of criteria and convenience sampling was used. Nevertheless, the author managed to interview a collection of very capable, though not numerous, experts. A description of the interviewees, and their credentials, is provided in Table 18-5.

Table 18-5: Interviewees interviewed for the expert interviews

	Overview	**Date and Location of Interview**
Mr A	Mr A (M.Eng. cum laude, B.Eng. Mechanical Engineering) has been a partner with McKinsey & Company since 2010. He co-leads McKinsey's Strategy and Corporate Finance, and Private Equity services in Africa.	24/01/2017 Sandown, Johannesburg
Dr B	Dr B is the former CEO of IHPC. IHPC (Institute for High Performance Consulting) is a boutique consultancy firm providing consulting services, training and product development. Their clients include companies such as Standard Bank, Anglo American, Murray & Roberts, Harmony, BHP Billiton, and Caltex.	25/01/2017 Lanseria International Airport
Mrs C	Mrs C (M.Com Industrial Psychology) was the head of Human Resources at Anglo American's Sishen Mine from 2010 to 2016. Anglo American's flagship mine, the Sishen iron ore mine in South Africa, is ranked tenth in the world in terms of iron ore output with 36 Mt of iron ore extracted in 2014. Being some 14 km long, Sishen mine is one of the largest open-pit mines in the world" (Basov, 2015). Previous experience: Principal Organisational Development at Kumba, HR Consultant at Kumba Resources, Industrial Psychologist at Iscor, and OD Consultant at Iscor Flat Products.	3/12/2016 Kathu, Northern Cape
Mr D	Mr D (M.Eng. Industrial Engineering) is a senior partner at CDI Cape. CDI assists their clients in implementing an integrated system of management that enhances employee engagement and delivers exceptional customer value. CDI's programmes are being implemented in companies throughout Africa, Australasia, Central America, the Middle East, North America, South America,	14/11/2016 Paarl, Western Cape

	South East Asia and Western Europe. Their clients include companies such as Anglo American Platinum, BHP Billiton, Clover, Coca-Cola, Cadbury, Dunlop, Lonmin, Miller Brewing Company, Nestlé, PepsiCo, Quantas, South African Breweries (SAB), and Volkswagen (CDi, 2013). Previous experience: Partner at CDI Holdings (South Africa), Partner at CDI Cape, Academy Manager at Pragma, and Training Manager at Distell.	

Four interviewees were found to be a sufficient number. The validity of the feedback is not based on a large sample of opinions, but on the authority of a small number of individually credible experts. It can be argued that the number of interviews has to be limited to ensure that critical feedback is not drowned out in statistical averages or medians. Retrospectively, it could be seen that doing more interviews, six instead of four, would not invalidate the findings even under worst-case assumptions. In order to simulate this it was assumed that the next two interviews could not be worse than interview 3. This is a reasonable assumption considering the two points discussed in Chapter 18.5.2.3. The assertion is further evidenced by comparing the feedback from the other three interviews to interview 2. The results of the worst-case assumption can be found in Appendix H, and should be considered in light of the results and discussion that follows.

18.5.2) Interview Data and Appraisal

The four interviews were conducted as outlined in Chapter 18.4.2. In all cases interviewees were comfortable enough with the presentation and demonstration in that the "No answer, more information required" option was not used once. Three of the four interviews provided very positive feedback. One of the four, interview 3 with Mrs C, provided only moderately positive feedback. This subsection provides the feedback obtained in each interview, introduced with a brief appraisal of the respective interviews. A detailed discussion of the feedback follows in the next subsection (Chapter 18.5.3). The following interviews are provided:

- 18.5.2.1) Interview with Mr A - Partner at McKinsey & Company since 2010.
- 18.5.2.2) Interview with Dr B - CEO of the Institute for High Performance Consulting.
- 18.5.2.3) Interview with Mrs C - Head of Human Resources at Sishen from 2010-2016.
- 18.5.2.4) Interview with Mr D - Senior partner at CDI Cape since 2014.

Note that the tables below are formatted to improve readability, and the format of the original questionnaires can be found in Table 18-3 and Table 18-4 in Chapter 18.4.3. The items on the questionnaire, Q1 to Q15, read as follows:

Q1) The DSS addresses an existing need (purpose).
Q2) The DSS can be used to improve practices regarding employee incentives (Performance).
Q3) The DSS improves decision making in terms of quality (Performance).
Q4) The DSS improves decision making in terms of speed (Performance).
Q5) The DSS is easy to use, i.e. it can be used by non-experts (Performance).
Q6) The DSS is suitable for use in organisations where individuals, groups, or work units, form a complex integrated system (Setting).
Q7) The DDS is able to make users aware of the most important considerations (Functionality).

Q8) The DSS can be used to assess current practices (Functionality).
Q9) The DSS can be used to identify Opportunities for Improvement (Functionality).
Q10) The DSS can be used to identify threats/dangers/risks (Functionality).
Q11) Have you used any tools that could fulfil the role of the DSS, even if only in part? If so, what tools?
Q12) How likely would you be to recommend the DSS to friends, colleagues, or acquaintances who are involved with the design or optimisation of employee incentive practices?
Q13) Regarding shortcomings: It would be helpful if the DSS….
Q14) Regarding concerns: I am concerned that the DSS…
Q15) Additional feedback or comments:

18.5.2.1) Interview 1: Mr A

Partner at McKinsey & Company since 2010
Sandown, Gauteng, South Africa
24 January 2017 at 14h00
Duration: 90 minutes

The interview with Mr A provided very positive feedback as can be seen in Table 18-6. Mr A demonstrated a good understanding of the role and functionality of the DSS after the initial presentation and suggested that a mature DSS would be very useful and easy to develop, with the groundwork laid in the rudimentary DSS.

Table 18-6: Mr A's questionnaire response (See Appendix G.1 for an image of the original hard copy)

Validation Questionnaire: To what extent do you agree with the following questions?							
	Disagree Strongly	*Disagree Moderately*	*Disagree Slightly*	*Agree Slightly*	*Agree Moderately*	*Agree Strongly*	*No answer, more information required*
1						**C**	
2						**C**	
3						**C**	
4				**C**		**M**	
5					**C**	**M**	
6						**C**	
7						**C**	
8						**C**	
9						**C**	
10						**C**	

Additional Feedback and Comments										
11	Not formal tools but frameworks and simple checklists to ensure that all first order effects of performance management system have been considered.									
12	1	2	3	4	5	6	**C**	**M**	9	10
13	**n/a**									
14	**n/a**									
15	Seems to be a comprehensive and well thought through research effort.									

18.5.2.2) Interview 2: Dr B

CEO of the Institute for High Performance Consulting
Lanseria International Airport, Gauteng, South Africa
25 January 2017 at 13h00
Duration: 120 minutes

The interview with Dr B provided very positive feedback as can be seen in Table 18-7. Dr B noted that the research addresses an area that is currently debated. He asserts that using the DSS would influence climate and culture positively as it helps users to understand how various considerations and mechanisms influence considerations important to Intrinsic Motivation. The function of the DSS to make users aware of alternatives was also praised. Dr B does note that while the DSS is a good system, "success lies in the implementation and communication with employees". This resonates with the disclaimer that the DSS is not to be used as a stand-alone tool, but in conjunction with existing tools, guidelines, practices, procedures, and/or models (see Chapter 3.2.2).

Table 18-7: Dr B's questionnaire response (See Appendix G.2 for an image of the original hard copy)

Validation Questionnaire: To what extent do you agree with the following questions?							
	Disagree Strongly	*Disagree Moderately*	*Disagree Slightly*	*Agree Slightly*	*Agree Moderately*	*Agree Strongly*	*No answer, more information required*
1						**C**[I]	
2						**C**[II]	
3					**C**		
4						**C**	
5					**C**		
6						**C**[III]	
7						**C**	
8						**C**[IV]	
9						**C**	
10						**C**[V]	

Additional Feedback and Comments										
11										
12	1	2	3	4	5	6	7	**C**	**M**	10
13										
14	The DSS is a good system – Success lies in the implementation and communication with employees.									
15										

Further Comments:

I) "Current debates around subject."
II) "Provides alternatives to be considered."
III) "Specifically unions."
IV) "Would influence climate and culture positively."
V) "If used correctly."

18.5.2.3) Interview 3: Mrs C

Head of Human Resources at Sishen from 2010-2016
Kathu, Northern Cape, South Africa
03 December 2016 at 09h00
Duration: 120 minutes

The interview with Mrs C provided moderately positive feedback as can be seen on Table 18-8. Two factors should be considered that may have had an influence on the feedback:

- Mrs C emphasised that she is a strong proponent of focusing on Intrinsic Motivation and not extrinsic motivation (the 'tension in the domain' is discussed in Chapter 2.2.3.6). As per the structured literature review the DSS takes the middle ground. This difference in underlying perspectives must be noted as it can cause difficulties. The concerns that Mrs C had with the DSS, however, do not seem to stem from this as indicated by the comments in the feedback.
- The role of the DSS, that it is not to be used as a stand-alone tool, but in conjunction with existing tools, guidelines, practices, procedures, and/or models (see Chapter 3.2.2), does not seem to have been communicated clearly to Mrs C. Note that the comments in the feedback focus on the DSS's inability to take legislative and socio-political aspects into account. Most of the 'agree slightly' or 'disagree slightly' responses (which were the least-favourable responses given by Mrs C) are surmised by the researcher to have been negatively influenced by this misconception. This emphasises the importance of noting the limitations of the DSS as discussed in Chapter 4.4.

It is therefore expected that the moderately positive overall feedback would have been more positive if the misconception in the second point above had not occurred. This interview thus emphasised the importance of making sure the limitations of the DSS are understood. Mrs C went on to note that the DSS, even in its rudimentary form, is "very useful for educational purposes".

Table 18-8: Mrs C's questionnaire response (See Appendix G.3 for an image of the original hard copy)

Validation Questionnaire: To what extent do you agree with the following questions?							
	Disagree Strongly	*Disagree Moderately*	*Disagree Slightly*	*Agree Slightly*	*Agree Moderately*	*Agree Strongly*	*No answer, more information required*
1					**C**		
2				**C**	**M[I]**		
3						**C[II]**	
4			**C**	**M**			
5			**C[III]**				
6					**C[IV]**		
7						**C**	
8					**C**		
9				**C[V]**			
10				**C**			

Additional Feedback and Comments										
11	No.									
12	1	2	3	4	5	**C+M**	7	8	9	10
13										
14										
15	Very useful for educational purposes (Managers/MBAs, HR professionals). Transformational legislation not considered.									

Further Comments:

I) "Taking legislative and socio-political aspects into account – unions, transformation legislation."
II) "Taking complications into account."
III) "Legislative Considerations."
IV) "Start-up organisations. Mature organisations – disagree slightly."
V) "If combined with employee input."
VI) "Unionise employees."

18.5.2.4) Interview 4: Mr D

Senior partner at CDI Cape since 2014
Paarl, Western Cape, South Africa
14 November 2016 at 09h00
Duration: 90 minutes

The interview with Mr D provided very positive feedback as can be seen in Table 18-9. Mr D demonstrated a good understanding of the role and functionality of the DSS after the initial presentation and stated that the mature DSS would be a very useful tool. The development of the rudimentary DSS was discussed in detail, including considerations such as guidelines for generic uses of the DSS, templates to help process discernments made by using the DSS and weightings on links (concluded to be impractical at this time).

Table 18-9: Mr D's questionnaire response (See Appendix G.4 for an image of the original hard copy)

Validation Questionnaire: To what extent do you agree with the following questions?							
	Disagree Strongly	*Disagree Moderately*	*Disagree Slightly*	*Agree Slightly*	*Agree Moderately*	*Agree Strongly*	*No answer, more information required*
1						***C***	
2						***C***	
3					***C***	***M***	
4					***C***	***M***	
5				***C***		***M***	
6						***C***	
7						***C***	
8						***C***	
9						***C***	
10						***C***	

Additional Feedback and Comments										
11										
12	1	2	3	4	5	6	7	**C**	9	**M**
13	note[I]									
14										
15	note[II]									

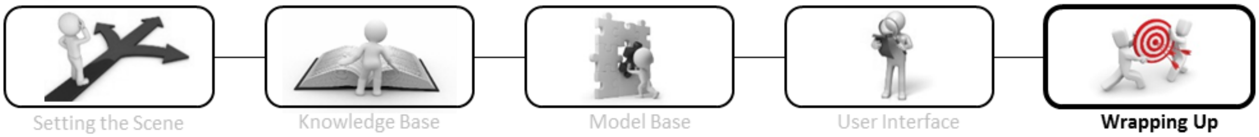
18.5.3) Results and Discussion

The items on the questionnaire are broken up into different types. The feedback for each of these types of questions is discussed separately. The exception being the open-ended questions (Q11 & Q13-15) which are incorporated into the discussion where appropriate.

Note that the median is taken as the aggregate position for each response. This helps to parse outliers; specifically uncritical replies and the misconception one of the interviewers held (refer to the second bullet in Chapter 18.5.2.3). The interviewees' motivation for outliers is examined alongside each question. As the median is between the two middle responses it may be between two options (between 'agree moderately' and 'agree strongly' and would hence be 'agree moderately to strongly'). This is indicated in the tables that follow.

This subsection proceeds by discussing the different types of questions as follows:

- 18.5.3.1) Purpose (Q1).
- 18.5.3.2) Performance (Q2-Q5).
- 18.5.3.3) Setting (Q6).
- 18.5.3.4) Functionality (Q7-Q10).
- 18.5.3.5) Net Promoter Score (Q12).



18.5.3.1) Feedback on 'Purpose'

The first type of question (Q1) sought to ascertain whether the DSS serves a valid purpose. This was achieved by asking interviewees to indicate to what extent they agreed with the statement:

- Q1 – "The DSS addresses an existing need".

The feedback from the various interviewees are collated in Table 18-10; the table is followed by a discussion of the feedback related to the specific statement.

Q1 – "The DSS addresses an existing need."

Table 18-10: An overview of feedback from questionnaire Q1

Validation Questionnaire: To what extent do you agree with the following questions?							
	Disagree Strongly	*Disagree Moderately*	*Disagree Slightly*	*Agree Slightly*	*Agree Moderately*	*Agree Strongly*	
1						C	*Mr A*
						C	*Dr B*
					C		*Mrs C*
						C	*Mr D*
						C/M	*Median*

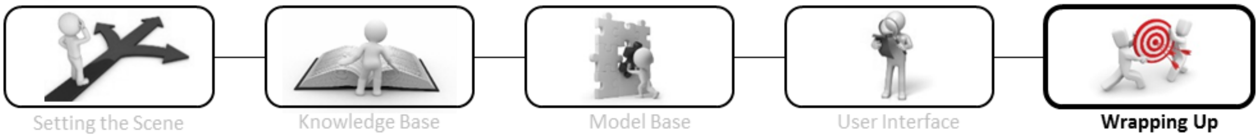
It is clear that the interviewees are in agreement that the DSS (even in its rudimentary form), addresses an existing need.

18.5.3.2) Feedback on 'Performance'

The second type of question (Q2-Q5) sought to ascertain whether the DSS can satisfy its purpose on a high level (Q2), and in terms of the functional specifications (see Chapter 4.2.1.1) associated with a DSS (Chapter 3.2.1.1). This was achieved by asking interviewees to indicate to what extent they agreed with the statements:

- Q2 – "The DSS can be used to improve practices regarding employee incentives."
- Q3 – "The DSS improves decision making in terms of quality."
- Q4 – "The DSS improves decision making in terms of speed."
- Q5 – "The DSS is easy to use, i.e. it can be used by non-experts."

The feedback from the various interviewees is collated in Table 18-11 to Table 18-14; the tables are followed by a discussion of the feedback related to the specific statement.



Q2 – "The DSS can be used to improve practices regarding employee incentives."

Table 18-11: An overview of feedback from questionnaire Q2

Validation Questionnaire: To what extent do you agree with the following questions?							
	Disagree Strongly	Disagree Moderately	Disagree Slightly	Agree Slightly	Agree Moderately	Agree Strongly	
2						C	Mr A
						C	Dr B
				C	M		Mrs C
						C	Mr D
						C/M	Median

The feedback indicates that, according to the interviewees, the DSS can be used to improve practices regarding employee incentives (even in its rudimentary form). The more negative response of Mrs C is due to a misconception (refer to the second bullet in Chapter 18.5.2.3). This emphasised the importance of making sure the limitations of the DSS are understood (The DSS does not address legal, transformational, or socio-economic concerns).

Q3 – "The DSS improves decision making in terms of quality."

Table 18-12: An overview of feedback from questionnaire Q3

Validation Questionnaire: To what extent do you agree with the following questions?							
	Disagree Strongly	Disagree Moderately	Disagree Slightly	Agree Slightly	Agree Moderately	Agree Strongly	
3						C	Mr A
					C		Dr B
						C	Mrs C
					C	M	Mr D
					C	**M**	Median

It is clear that the interviewees are in agreement that the DSS (even in its rudimentary form) improves decision-making in terms of quality.

Q4 – "The DSS improves decision making in terms of speed."

Table 18-13: An overview of feedback from questionnaire Q4

Validation Questionnaire: To what extent do you agree with the following questions?							
	Disagree Strongly	Disagree Moderately	Disagree Slightly	Agree Slightly	Agree Moderately	Agree Strongly	
4				C		M	Mr A
						C	Dr B
			C	M			Mrs C
					C	M	Mr D
				C		**M**	Median

The interviewees agreed ‘moderately-to-slightly’ that the rudimentary DSS improves decision-making in terms of speed. When the mature DSS is considered, the interviewees ‘agree strongly’. With the mature DSS the more-negative response of Mrs C was due to a misconception (refer to the second bullet in Chapter 18.5.2.3). As Mrs C was concerned that the DSS does not cater for legal and socio-political concerns the DSS development that was outlined did not improve her answer to Q4 considerably.

Q5 – “The DSS is easy to use, i.e. it can be used by non-experts.”

Table 18-14: An overview of feedback from questionnaire Q5

Validation Questionnaire: To what extent do you agree with the following questions?							
	Disagree Strongly	*Disagree Moderately*	*Disagree Slightly*	*Agree Slightly*	*Agree Moderately*	*Agree Strongly*	
5					C	M	*Mr A*
					C		*Dr B*
			C				*Mrs C*
				C		M	*Mr D*
					C	**M**	*Median*

The interviewees agreed ‘moderately-to-slightly’ that the rudimentary DSS can be used by non-experts. When the mature DSS is considered the interviewees agreed ‘moderately-to-strongly’. With the mature DSS the more negative response of Mrs C was due to a misconception (refer to the second bullet in Chapter 18.5.2.3). As Mrs C was concerned that the DSS does not cater for legal and socio-political concerns she was of the opinion that the DSS could not be used by non-experts. This emphasises the importance of making sure the limitations of the DSS are understood

18.5.3.3) Feedback on ‘Setting’

The third type of question (Q6) sought to ascertain whether the DSS is suitable for use in the specified setting (see Chapter 1.2.3.2) by meeting the scenario-based specifications (see Chapter 4.2.1.3). This was achieved by asking interviewees to indicate to what extent they agreed with the statement:

- Q6 – “The DSS is suitable for use in organisations where individuals, groups, or work units, form a complex integrated system”.

The feedback from the various interviewees are collated in Table 18-15; the table is followed by a discussion of the feedback related to the specific statement.

Q6 – "The DSS is suitable for use in organisations where individuals, groups, or work units, form a complex integrated system."

Table 18-15: An overview of feedback from questionnaire Q6

Validation Questionnaire: To what extent do you agree with the following questions?							
	Disagree Strongly	*Disagree Moderately*	*Disagree Slightly*	*Agree Slightly*	*Agree Moderately*	*Agree Strongly*	
6						C	*Mr A*
						C	*Dr B*
					C		*Mrs C*
						C	*Mr D*
						C/M	*Median*

It is clear that the interviewees were in agreement that the DSS (even in its rudimentary form) is suitable for use in organisations where individuals, groups, or work units, form a complex integrated system.

18.5.3.4) Feedback on 'Functionality'

The fourth type of question (Q7-Q10) sought to ascertain whether the DSS functioned as required to fulfil its purpose (see Chapter 3.2.4) by meeting the technical specifications (see Chapter 4.2.1.2). This was achieved by asking interviewees to indicate to what extent they agree with the statements:

- Q7 – "The DDS is able to make users aware of the most important considerations."
- Q8 – "The DSS can be used to assess current practices."
- Q9 – "The DSS can be used to identify opportunities for improvement."
- Q10 – "The DSS can be used to identify threats/dangers/risks."

The feedback from the various interviewees are collated on Table 18-16 to Table 18-19; the tables are followed by a discussion of the feedback related to the specific statement.

Q7 – "The DDS is able to make users aware of the most important considerations."

Table 18-16: An overview of feedback from questionnaire Q7

Validation Questionnaire: To what extent do you agree with the following questions?							
	Disagree Strongly	*Disagree Moderately*	*Disagree Slightly*	*Agree Slightly*	*Agree Moderately*	*Agree Strongly*	
7						C	*Mr A*
						C	*Dr B*
						C	*Mrs C*
						C	*Mr D*
						C/M	*Median*

It is clear that the interviewees were in agreement that the DSS is able (even in its rudimentary form), to make users aware of the most important considerations. This is the only statement that all interviewees agreed with strongly; this is significant as the most important considerations, or the 13 PICs, are at the centre of the foundation that the DSS is built upon.

Q8 – "The DSS can be used to assess current practices."

Table 18-17: An overview of feedback from questionnaire Q8

Validation Questionnaire: To what extent do you agree with the following questions?							
	Disagree Strongly	*Disagree Moderately*	*Disagree Slightly*	*Agree Slightly*	*Agree Moderately*	*Agree Strongly*	
8						C	*Mr A*
						C	*Dr B*
					C		*Mrs C*
						C	*Mr D*
						C/M	*Median*

It is clear that the interviewees were in agreement that the DSS (even in its rudimentary form), can be used to assess current practices.

Q9 – "The DSS can be used to identify opportunities for improvement."

Table 18-18: An overview of feedback from questionnaire Q9

Validation Questionnaire: To what extent do you agree with the following questions?							
	Disagree Strongly	*Disagree Moderately*	*Disagree Slightly*	*Agree Slightly*	*Agree Moderately*	*Agree Strongly*	
9						C	*Mr A*
						C	*Dr B*
				C			*Mrs C*
						C	*Mr D*
						C/M	*Median*

It is clear that the interviewees were in agreement that the DSS (even in its rudimentary form) can be used to identify Opportunities for Improvement (OFIs). The more negative response of Mrs C was due to a misconception (refer to the second bullet in Chapter 18.5.2.3). This emphasised the importance of making sure the limitations of the DSS are understood (the DSS does not address legal, transformational, or socio-economic concerns).

Q10 – "The DSS can be used to identify threats/dangers/risks."

Table 18-19: An overview of feedback from questionnaire Q10

Validation Questionnaire: To what extent do you agree with the following questions?							
	Disagree Strongly	*Disagree Moderately*	*Disagree Slightly*	*Agree Slightly*	*Agree Moderately*	*Agree Strongly*	
10						C	*Mr A*
						C	*Dr B*
				C			*Mrs C*
						C	*Mr D*
						C/M	*Median*

It is clear that the interviewees were in agreement that the DSS (even in its rudimentary form), can be used to identify threats/dangers/risks. The more negative response of Mrs C was due to a misconception (refer to the second bullet in Chapter 18.5.2.3). This emphasised the importance of making sure the limitations of the DSS are understood (The DSS does not address legal, transformational, or socio-economic concerns).

18.5.3.5) The Net Promoter Score

The net promoter score (Q12), which is essentially a loyalty indicator, is inserted to give an indication of how usable the DSS is. Recall that 0-6 indicates detractors, 7-8 indicates passives, and 9-10 indicates promotors. In this regard interviewees were asked the question:

- Q12 – "How likely would you be to recommend the DSS to friends, colleagues, or acquaintances who are involved with the design or optimisation of employee incentive practices?"

Table 18-20 indicates how the interviewees answered the question:

Table 18-20: An overview of feedback from questionnaire Q10

Additional Feedback and Comments											
	1	*2*	*3*	*4*	*5*	*6*	*7*	*8*	*9*	*10*	
12							C	M			*Mr A*
								C	M		*Dr B*
						C+M					*Mrs C*
								C		M	*Mr D*

While the net promoter score is not intended to be a primary indicator, and respondents were not told what the weightings were, some inferences can be made:

- Based on the net promoter score the respondents* are passive, not promotors or detractors, in relation to recommending the rudimentary DSS.
- Based on the net promoter score the responders are likely to be promotors in relation to recommending the mature DSS*.

* The more negative response of Mrs C was due to a misconception (refer to the second bullet in Chapter 18.5.2.3). This emphasises the importance of making sure the limitations of the DSS are understood (the DSS does not address legal, transformational, or socio-economic concerns).

This is a satisfactory result as the rudimentary DSS is not intended to be a mature construct that is ready for external use.

18.5.4) Summary of Expert Interviews

The feedback from interviewees, as shown in Table 18-21, is very positive overall.

Table 18-21: The median feedback from interviewees

Validation Questionnaire: To what extent do you agree with the following questions?											
	Disagree Strongly		*Disagree Moderately*		*Disagree Slightly*		*Agree Slightly*		*Agree Moderately*		*Agree Strongly*
1											**C/M**
2											**C/M**
3										**C**	**M**
4								**C**			**M**
5								**C**		**M**	
6											**C/M**
7											**C/M**
8											**C/M**
9											**C/M**
10											**C/M**

The feedback for Q4 and Q5 regarding the rudimentary DSS is not as positive as for the other statements. This addresses the DSS improving decision-making in terms of speed, and the DSS being easy to use. Both of these factors are expected to be improved with further development as indicated by the feedback for a mature DSS.

It must be noted that one of the interviewees gave less positive feedback (refer to Table 18-8) for various questions. This was due to a misconception regarding the role of the DSS (refer to the second bullet in Chapter 18.5.2.3). This emphasised the importance of noting the limitations of the DSS as discussed in Chapter 4.4. The DSS does not address legal, transformational, or socio-economic concerns.

It was determined that the number of expert interviews, four, was sufficient. A worst-case scenario is discussed at the end of Chapter 18.5.1. The results of this analysis, found in Appendix H on Table H-1, can be compared with Table 18-21. The worst-case results would still be able to satisfy the validation requirements.

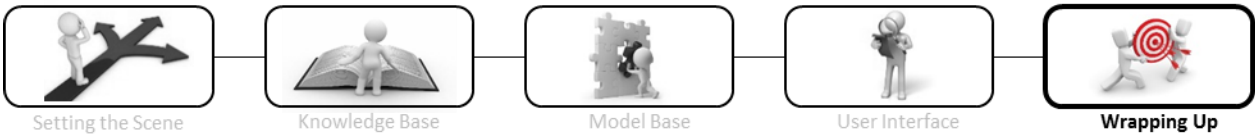
As a whole the validation confirms that the DSS:

- addresses an existing need (Q1).
- can be used, even in its rudimentary form, to satisfy this need (Q2-Q5), though there is certainly room for improvement.
- addresses the need in the specified domain or situations (Q6).
- has the specified functionality (Q7-Q10).

18.6) Summary

This subsection concludes Chapter 18: Verification and Validation.

This chapter verified that the research and the final artefact, the DSS, satisfied the research specifications. This was done on both a high level, and against secondary functional requirements. The validation phase provided compelling evidence in support of the claims made in the verification and demonstration phases. Through the use of expert interviews the validation strongly indicated that the DSS addresses an existing need, satisfies this need even in its rudimentary form, does this in the specified domain or situations, and has the specified functionality.



Chapter 19: Conclusion

"Real knowledge is to know the extent of one's ignorance."

-Confucius

19.1) Introduction

This subsection introduces Chapter 19: Conclusion.

This research addressed the challenge of helping organisations to improve employee motivation, specifically through their incentive practices. The most important considerations that need to be taken into account when incentive practices are designed or evaluated, the Primary Incentive plan design Considerations (PICs), were identified through a systematic literature review. These 13 PICs were then used as the basis for the development of a Decision Support System (DSS). The DSS, whilst still in a rudimentary form, highlights the importance of the 13 PICs, and helps users to understand how the 13 PICs are related to each other, to Incentive Mechanisms (IMs), and to the Elements of Job Design (EJD). Decision-making, with regard to incentive practices, is improved in terms of both quality and speed. The process followed for the structured literature review can be repeated at any time to reflect prospective developments in the theoretical landscape regarding employee incentives and motivation, and the constructs formulated in the Model Base (MB) are able to be updated to reflect such changes.

Chapter 19 provides readers with an overview of the research's conclusions. After providing a review of the research, the research contribution is discussed. This is followed by a discussion of the research's limitations before future work is considered.

This chapter is structured as follows:

- Chapter 19.1) Introduction
- Chapter 19.2) Review
    - A review of the research.
- Chapter 19.3) Research Contribution
    - An overview of the contributions made by this research.
- Chapter 19.4) Limitations
    - A discussion of the limitations of the research and DSS.
- Chapter 19.5) Future Work
    - A Discussion of the development and research opportunities that flow from this research.
- Chapter 19.6) Concluding Remarks

19.2) Review

This subsection provides a high-level review of the research.

Following the problem identification the primary research question was formulated as: "How can organisations utilise the literature on incentives, employee motivation, and job design to enhance organisational performance?" Pragmatism was selected as the main philosophical perspective. The research methodology consisted of two major phases; a structured literature review and the construction of a Decision Support System (DSS). The structured literature review identified 13 PICs, and Phase 2 developed a DSS that can be used to understand and utilise the findings of Phase 1. The use of the DSS was demonstrated through various applications in two Hypothetical Illustrative Case Studies (HICS), and the use of the DSS was externally validated through expert interviews.

19.2.1) Problem Identification

The importance of employee motivation or engagement and the challenges apropos incentive practices highlight the significance of the question posed by two of the most influential authors in the field of incentives, Holmström & Milgrom (1991, p. 50): "Given a highly incomplete set of performance measures and a highly complex set of potential responses from the agent [employee], how can the agent be motivated to act in the social interest?" It was noted that, despite concerns, most organisations use incentives in some form, and that this use appears to be growing rather than declining. Seeing that this use can be beneficial, but can also cause more harm than good by giving rise to dysfunctional behavioural responses, it is imperative that incentive plans are appropriately designed and supported. This research focused on the design side of the challenge.

The literature on incentives and motivation is extensive and integrates knowledge from a variety of disciplines such as economics, management, organisational theory, psychology, finance and human resources. In addition to the width and breath of the literature there are different schools of thought that often seem to be, and sometimes are, contradictory. Different disciplines and schools of thought emphasise different aspects. While the literature on incentives and motivation is well developed, it was found that the available tools and guidelines do not holistically incorporate the primary considerations that incentive plan designers have to be aware of. It is reasonable to postulate that this is a significant factor contributing to the situation where incentive plans often do more harm than good; there is no disagreement that when incentives are not appropriately applied detrimental effects are common.

19.2.2) Solution Objectives

In light of the problem discussed above the problem statement was formulated as:

> *"The performance of organisations is adversely affected by employees who are not appropriately incentivised."*

This led, in conjunction with the findings from the structured literature review in Chapter 5, to the formulation of the primary research question as:

> *"How can organisations utilise the literature on incentives, employee motivation, and job design to enhance organisational performance?"*

In light of the problem statement, primary research question, and results from the structured literature review, the primary objective was formulated as:

> *"Develop a Decision Support System that can be used to improve an organisation's employee incentives practices."*

19.2.3) Research Methodology

This research adopted pragmatism as its main philosophical perspective. In pragmatism, knowledge development is conducted through an inquiry process starting with problematic situations; knowledge is developed to better cope with the world (Goldkuhl G. , 2012, p. 92). The first phase of the research involved a structured literature review; this phase tended towards the positivist paradigm and was objective (even though source material is a mixture of quantitative and qualitative research). The second phase of the research involved the development of an artefact that was built on the findings of the first phase; this phase tended towards the interpretive or constructivist paradigm. An overview of the various research activities is as follows:

1) Problem Identification (see Chapter 1.4).
2) Research Objectives and Research Design (see Chapter 1.4.4, as well as Chapter 3 and Chapter 4).
3) Phase 1 – Structured Literature Review (see Section B, specifically Chapter 5).
4) Phase 2 – Construction of Decision Support System (see SECTION B, C, and D).
5) Demonstration, Verification, and Validation (see SECTION E).

This research would not be feasible if it were restricted to a single discipline and inadvertently answers and echoes the call for researchers to "throw off their single-paradigm-induced blinders, to adopt a management problem-based (rather than a discipline-based) orientation, and to work toward integration of findings by incorporating in their research designs variables, perspectives, terminologies, and findings from other related research areas" (Merchant, Van der Stede, & Zheng, 2003, p. 251). While the research draws from various fields the focus of the research is not on these subjects themselves: The knowledge from these fields is merely utilised as part of the analysis, design, planning, management, or optimisation of an integrated system consisting of people, money, equipment, and information to further the effective and efficient production of quality goods or services. In other words the research takes a systems engineering approach to solving the aforementioned problem. The purpose of the research, and artefact, could be described as increasing the usability and relevance of knowledge to users for decision-making purposes. This resonates with pragmatism's epistemology where the role of knowledge is to be useful for action and change (Goldkuhl G. , 2011, p. 142).

19.2.4) Structured Literature Review

The structured literature review identified 13 PICs. Job Design, while not a primary consideration, was recognised as a potent tool that can be used to significantly influence many of these considerations. The PICs* were sorted into three categories:

- Input Considerations: Career Concerns, Agent's Level of Risk Aversion, Job Complexity, Performance Measurability, and Team Production.
- Underlying Considerations: Perceived Fairness, Autonomy, Perceived Competence, Relatedness/Purpose, and Risk to Agent.
- Response Considerations: Gaming/Multitasking, Intrinsic Motivation, and Selection Effects.

*A description of each PIC can be found in Appendix A.1.

A systematic approach was required as researchers can easily be streamlined into certain schools of thought through confirmation bias, and to ensure that the extensive amount of information is comprehensively examined. It is thus noteworthy that the items on the list testify that the structured review process was successful in not limiting itself to a specific field. The structured literature review suggests that both extrinsic and intrinsic considerations should be taken into account.

It is important to note that the results of the structured literature review represented a snapshot in time of the theoretical landscape with regards to incentives and employee motivation. It is possible that the theoretical landscape will evolve or develop in the coming decades. The process designed to determine the 13 PICs can be repeated at any time to reflect such development.

19.2.5) Decision Support System

A Decision Support System (DSS) was identified as an appropriate form for the artefact. The developed DSS is not fully mature: The User Interface is developed to such a degree that the DSS's use can be demonstrated, but not to such a degree that the DSS is ready for commercial use.

The purpose and primary function of the DSS is to help users to apply Incentive Mechanisms correctly and efficiently, by helping them to make the correct design decisions based on the information extracted from the systematic literature review. Decision-making can be improved in terms of quality and speed. The DSS does not address the entire process surrounding the implementation of incentive plans, but only the design or development considerations in terms of employee motivation and incentive considerations. Socio-political or legal considerations are not addressed.

The final form of the artefact is specifically a knowledge-driven personal Decision Support System that acts in an advisory capacity and is composed of a Knowledge Base (KB), Model Base (MB), and User Interface (UI):

- Knowledge Base (The knowledge that the DSS utilises to solve problems): The 13 PICs serve as the cornerstone or backbone of the KB. The Knowledge Base is expanded as required to provide the knowledge/information/intelligence that the models are to be built upon. Expanding the Knowledge Base beyond the 13 PICs involves: Identifying and describing the available Incentive

Mechanisms (IMs) and Elements of Job Design (EJD); identifying and describing the links between the PICs, between the PICs and IMs, between the PICs and EJD, and between the IMs and EJD.

- Model Base (The models that the DSS employs to make sense of the KB): The MB consists of a series of models showing the relationships or links between the PICs, IMs, and EJD.
- User Interface (The interface that the user utilises to interact with the KB and MB): The UI is developed to such a degree that the DSS's use can be demonstrated, but not to such a degree that the DSS is ready for commercial use. An Integrated Links Model (ILM) and Cascading Effects Models (CEMs) were provided to complement the existing models in the MB, and opportunities for further development were discussed.

If the structured literature review is repeated at some time in the future, and some PICs are added or removed, the DSS is able to be amended to incorporate any such changes in the findings.

19.2.6) Demonstration and Verification

The use of the DSS is demonstrated through various applications in two Hypothetical Illustrative Case Studies (HICS). In addition to demonstrating how the DSS can be used, the HICS served the secondary function of helping to improve the DSS itself. This process is not recorded, but was intrinsically part of the iterative 'learning by building' approach common to pragmatism. The demonstration also helped to verify that the research, and the DSS specifically, met the determined requirements or specifications.

19.2.7) Validation

Through the use of expert interviews, the external validation indicated that the DSS addressed an existing need, provides a framework that can address the need, did this in the specified domain or situations, and has the specified functionality.

The expert interviews served as the final validation step. They can be thought of as external validation. Various phases of internal validation were required in the design of the DSS. Each sub-model, or iteration of a sub-model, was subject to an internal evaluation. This included theoretical role-playing and third-party feedback. The culmination of the sub-models, the rudimentary DSS, was similarly evaluated. The DSS's demonstration in the Hypothetical Illustrative Case Studies (HICS) serves as a further validation.

19.3) Research Contribution

This subsection provides an overview of the contributions made by this research.

This research makes a significant theoretical contribution through identifying the 13 Primary Incentive plan design Considerations (PICs). A further contribution is made on a practical level with the development of the Decision Support System (DSS). The primary contribution does not, however, lie with the 13 PICs that were identified, nor with the DSS that was developed, but with the underlying processes and frameworks that were designed to identify the 13 PICs and that the DSS is built upon. The research ultimately improves the quality of existing knowledge, making it more useful for decision-making purposes.

19.3.1) Theoretical

The literature on incentives and motivation is extensive and integrates knowledge from a variety of disciplines such as economics, management, organisational theory, psychology, finance, and human resources. In addition to the width and breath of the literature there are different schools of thought that often seem to be, and sometimes are, contradictory. Different disciplines and schools of thought emphasise different aspects. While the literature on incentives and motivation is well developed, it was found that the available tools and guidelines do not holistically incorporate the primary considerations that incentive plan designers have to be aware of. It is reasonable to postulate that this is a significant factor contributing to the situation where incentive plans often do more harm than good; there is no disputing that when incentives are not appropriately applied detrimental effects are common.

This research identified the 13 PICs; the most important considerations that must be taken into account in the design or development of an incentive plan. The 13 PICs are a unique amalgamation, based on a structured literature review process, from influential research papers that deal with incentives and motivation from various disciplines. The most developed model in terms of PICs considered seems to be the PIBI model (see Chapter 1.4.1), yet even the PIBI model only references seven of the thirteen PICs. The identification of the PICs improves the quality of the knowledge that is required to improve organisations' incentive practices.

From a theoretical point of view this research makes a significant contribution not only through identifying the 13 PICs, but more fundamentally by designing a process that can be followed to identify the PICs. The 13 PICs represents a snapshot in time of the theoretical landscape regarding incentives and employee motivation. It is possible that the theoretical landscape will evolve or develop in the coming decades. The process designed to determine the 13 PICs can be repeated at any time to reflect such development. In this vein it might also be added that the process designed in this research could be adapted to address other areas of research that face similar challenges (further discussed in Chapter 19.5.2).

19.3.2) Practical

The 13 PICs themselves are useful for action and change, the research does however go on to lay the groundwork for a DSS that further improves the utility of the findings.

While the Model Base (MB), and especially the Knowledge Base (KB), are well developed, a mature User Interface (UI) is not developed. The UI is developed to such a degree that the DSS's use can be demonstrated, but not to such a degree that the DSS is ready for commercial use. Even in its rudimentary form the DSS lends considerable support to decision-makers. The DSS provides users with various tools, and a database, that can be applied in numerous ways to make better decisions, and perhaps more importantly to make them faster.

The DSS highlights and explains the 13 PICs to users. It also helps users to understand the various relationships that exist between the PICs, Incentive Mechanisms (IMs), and the Elements of Job Design (EJD). This is communicated through six link models, an overview and conceptualisation of the various link models as a complex spiderweb, an Integrated Links Model (ILM), and the Cascading Effects Models (CEMs).

From a practical point of view this research makes a significant contribution not only through the development of the DSS, but more fundamentally by designing the framework that the DSS is built upon. It is possible that the theoretical landscape will evolve or develop in the coming decades. The structured literature review can be repeated at any time to reflect this, and the DSS is able to be amended to incorporate any changes in the findings.

19.3.3) In Terms of Knowledge

The identification of the 13 PICs and the development of the DSS improves the quality of existing knowledge. Relevant knowledge can be said to have moved away from a lower state where usability is marginal or potential, towards a higher state where usability is clearer and more immediate:

- The relevance of the knowledge increases with respect to accomplishing some objective.
- Possibilities of knowledge overload diminish.
- Knowledge quality tends to increase.

Consider the progression of the six states of knowledge as identified by van Lohuizen in 1986, which roughly correspond to Simon's three phases of decision-making (Holsapple, 2008a, p. 40), depicted in Figure 1-4 (repeated below):

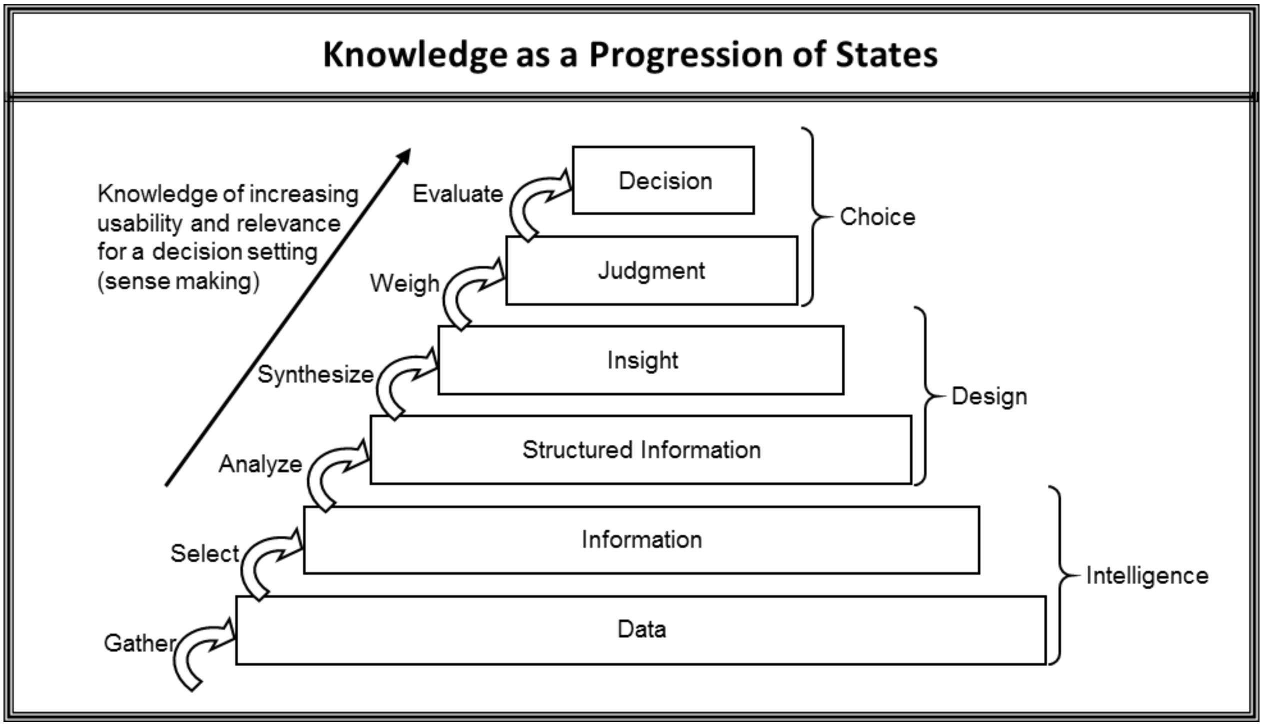


Figure 1-4: Knowledge as a progression of states (Holsapple, 2008a, p. 40) – digitally enhanced

From this perspective the research improved the state of knowledge which increased its usability and relevance for a decision-making setting. Data and information available in the literature was gathered and selected, then analysed and structured so that it could be synthesised into insights which users can weigh and apply their judgement to in order to better evaluate decisions. The initial data/information identified in the structured literature review can be thought of as a collection of the structured information and insights of a variey of authors in various domains.

Not only is the quality of knowledge improved for a specific point in time, but the processes and underlying framework that the research designed is able to be used to reflect amendments that may be required due to prospective development in the theoretical landscape.

19.3.4) Further Insights

19.3.4.1) Tension in the Domain

It is recognised that there exists a tension between strong advocates of intrinsic and extrinsic motivation. This study has led the author to conclude that both viewpoints contain considerations and arguments that should not be ignored. When an unbalanced perspective is adopted, with one viewpoint unduly relegated, the likelihood and severity of dysfunctional behavioural responses becomes a significant hazard. It is certainly difficult to determine the weight of competing considerations. This should not lead to a simple one-dimensional approach, but encourage a balanced and more holistic approach. This deduction is not unique or novel. See Chapter 2.2.3.6 for a more detailed discussion of the tension in the domain.

19.3.4.2) Autonomy as an Incentive Mechanism

This research highlights that Autonomy can be, and often is, albeit informally or subconsciously, used as an Incentive Mechanism.

It is interesting to note that Autonomy is classified as a PIC (PIC7), as a type of Incentive Mechanism (IM6), and as an Element of Job Design (EJD1). It seems to be widely accepted that it is important to provide employees with autonomy where possible, and that this has a positive effect on an employees' Intrinsic Motivation. This is affirmed in Link Model PIC↔PIC. It is concurrently not surprising that Job Design can be used to design a job or work in such a way that employees are provided with more autonomy, be it method autonomy, scheduling autonomy, criteria autonomy, or team autonomy. Thinking of Autonomy as an IM does not seem to be common practice, however (as evidenced by its omission from the typical incentive mechanisms as found in the public domain, that is in textbooks and online sources). In the same way, or variety of ways, that incentives such as money, recognition, shares, or equity can be employed, Autonomy can be employed as an incentive mechanism. This is often done informally or subconsciously; consider the reliable employee who is granted more scheduling autonomy, or the competent employee who is granted more method autonomy.

The concept of providing a stimulus for Intrinsic Motivation as an extrinsic incentive is fascinating on a theoretical level. This research does explore this phenomenon. It is hoped that identifying the practice will broaden designers' toolboxes, and encourage future research.

19.4) Limitations

This subsection contains a discussion of the limitations of the research and DSS.

Certain limitations are to be kept in mind when the research, especially the DSS, is regarded. Recall that with pragmatism, value is determined in terms of usefulness. If Confucius was right that "real knowledge is to know the extent of one's ignorance", we could infer that "maximum utility is dependent on an awareness of limitations". A racing driver can get the most out of a vehicle with a good understanding of the maximum speed that the car can take certain corners at; a DSS user can get the most out of the artefact with a good understanding of what the DSS addresses and what it does not address. This subsection notes the limitations of the DSS specifically, and of the research in general.

When the DSS is regarded it must be kept in mind that various limitations exist due to its scope, in addition to obvious functional limitations such as the DSS's User Interface being only in a rudimentary form. If a user misunderstands what the DSS addresses and encompasses, certain processes and considerations will be compromised. In this regard it is necessary to maintain a clear picture of the function and position of the artefact in the overall process involved with the implementation of an incentive plan (see Figure 3-1 specifically). The DSS is not intended to replace existing tools and guidelines, but accompanies them in the area of design considerations specifically; the 13 PICs focus on incentive plan design considerations from a moral-hazard/employee-motivation/goal-alignment/incentive-mechanisms/job-design point of view. In addition to this, the DSS functions as an advisory system; advisory systems do not make decisions but rather help guide the decision-maker in the decision-making process, while leaving the final decision-making authority up to the human user. The DSS is built on principles, and not moulded to a specific country, industry, or type of employee. The following limitations are thus to be kept in mind:

- **Decision 'Support'**: The DSS is not able to make concrete decisions for users. Instead it helps users in the decision-making process by making them aware, and helping them to understand, the Primary Incentive plan design Considerations, as found in Chapter 5 and Appendix A.1.
- **Strategy**: The artefact is not focused on helping users formulate the required business strategies that are required to determine the objectives of an incentive plan. See Figure 3-1.
- **Implementation**: The artefact is not geared to assist users with implementation, monitoring, or adjustment steps. See Figure 3-1.
- **Legal and Socio-Political Considerations**: The artefact is built on motivation and incentive principles, it is not able to provide for legal considerations or socio-political considerations.
- **Specifics**: As the artefact is built on principles, it is not tailored to address specific employees, industries, legal systems, or socio-political environments.

From a theoretical point of view it is important to note what the findings in the structured literature review assert and do not assert. The findings in the structured literature review identified the most important incentive plan design considerations according to the key influential works: 'according to' being the pivotal term. The research consequently does not formulate new theories or considerations, and is not focused on directly addressing areas of tension. In line with pragmatism's axiology, the structured literature review merely improved the utility of existing knowledge.

19.5) Future Work

This subsection discusses the development and research opportunities that flow from this research.

Various avenues of future work are presented by this research. These can be sorted into development opportunities and research opportunities. The development opportunities centre on improving the DSS both functionally and conceptually. The research opportunities consider how the findings and underlying processes designed in this research could serve as a platform for further research.

19.5.1) Development Opportunities

This research developed the User Interface (UI) to such a degree that the DSS's use can be demonstrated, but not to such a degree that the DSS is ready for commercial use. As Chapter 16 is dedicated to discussing the development opportunities this subsection will only provide an overview. The User Interface (UI) could be improved in various ways. Improvements should focus on improving decision-making in terms of quality and/or speed. The most obvious opportunity for further development would be to convert the DSS into an electronic format. Users would be able to navigate the various models and access information with much greater speed. Further development opportunities regarding existing constructs include providing templates or other aids to help users process information or discernments made using the DSS, providing guidelines that help users to perform various exercises using the DSS, and designing further constructs that help users to understand/compare/analyse/process information in the Knowledge Base and/or Model Base. On a high level a mature UI could include an extra connectedness layer that is more user-friendly, and filtering capabilities to provide users with targeted information. On a more practical level situation specific considerations could be added to the KB. This could include legal and socio-political considerations.

19.5.2) Research Opportunities

Both the findings, the 13 PICs and the DSS, as well as the underlying processes that was designed as part of this research, present opportunities for further research:

- The structured literature review could be applied in other domains to determine important considerations. In some cases the same framework might even be used to develop DSSs.
- As the findings reflect the theoretical landscape, and the theoretical landscape evolves over time, this research presents interesting avenues to investigate how a particular theoretical landscape evolves, at what rate, and how practice can keep up with the developments.
- The Links between the various nodes (between the PICs themselves, but also with Incentive mechanisms and Elements of Job Design) could be investigated in greater detail. This might allow the development of a model that is able to assign weightings to various links that are sensitive to the necessary variables (i.e. weightings that change in light of variables to address specific situations).

19.6) Concluding Remarks

"If I have seen further than others,

it is by standing upon the shoulders of giants."

-Isaac Newton

It can be tempting to construct an incentive plan with one's own intuition. While many such plans are successful, many incentive plans also fail. Detrimental effects are common with incorrect application. Avoid this trap and use the aids that are available.

While there are various useful models that can be consulted with regards to the development of an incentive plan, the models do not address incentive plan design considerations in sufficient detail. This challenge is addressed through the development of a Decision Support System (DSS) that can be used to improve an organisation's employee incentive practices. The DSS is built around the findings of a structured literature review that identified the most important considerations that must be taken into account when an incentive plan is designed or evaluated; the 13 PICs. The items that make up the PICs testify that the structured review process was successful in not limiting itself to a specific field. This seemed to be the differentiating factor between the 13 PICs and existing models. Existing models often emphasise one domain, while neglecting others. It might be surprising to the reader that such an overview of the theory did not already exist. This emphasises the complexity of the field and the difficulty designers are faced with when researching the topic. Note that the Decision Support System is not intended to be used as a stand-alone tool, but in conjunction with existing tools, guidelines, practices, procedures, and/or models.

While the findings from the structured literature review and the developed DSS are rigorous and detailed, it must be noted that the answer to the research question lies in the processes and underlying framework that the research designed. Prospective development in the theoretical landscape behind employee motivation and incentives hence poses no problem; the structured literature review can be repeated at any time to reflect this, and the DSS is able to be amended to incorporate any changes in the findings.

Continuing with Isaac Newton's analogy: This research does not merely convey what it has seen by climbing onto the shoulders of giants - it builds a ladder.

References

Allen, T. D. (2006). Rewarding good citizens: The relationship between citizenship behavior, gender, and organizational rewards. *Journal of Applied Social Psychology, 36*(1), 120-143.

Alter, S. L. (1990). *Decision support systems: Current practice and continuing challenge.* Reading, MA: Addison-Wesley.

Andreu, G. (1997). *Egypt in the age of the pyramids (D. Lorton, Trans.).* NY: Cornell University Press.

Anthony, R., & Govindarajan, V. (2007). *Management control systems.* Singapore: Irwin.

Antony, S., & Santhanam, R. (2008). Could the use of a knowledge-based system lead to implicit learning? In F. Burstein, & C. W. Holsapple, *Handbook on Decision Support Systems 1* (pp. 791-812). Berlin: Springer.

Aparicio, A. F., Vela, F. L., Sanchez, J. L., & Montes, J. L. (2012). Analysis and application of gamification. *Proceedings of the 13th International Conference on Interacción Persona-Ordenador - INTERACCION '12.*

Arnott, D. (2008). Personal decision support systems. In F. Burstein, & C. W. Holsapple, *Handbook on Decicion Support Systems 2* (pp. 121-140). Berlin: Springer.

Arnott, D., & Pervan, G. (2005). A critical analysis of decision support systems research. *Journal of Information Technology, 20*, 67-87.

Arnott, D., & Pervan, G. (2008). Eight key issues for the decision support systems discipline. *Decision Support Systems, 44*, 657-672.

Babbage, C. (1835). *On the economy of machinary and manufacturing.* London: Knight.

Babcock, P., Bedard, K., Charnes, G., Hartman, J., & Royer, H. (2011). *Letting down the team? Evidence of social effects of team incentives.* Cambridge: National Bureau of Economic Research.

Baker, G. P. (1992). Incentive contracts and performance measurement. *Journal of Political Economy, 100*(3), 598-614.

Baker, G. P., Jensen, M. C., & Murphy, K. J. (1988). Compensation and incentives: Practice vs. theory. *The Journal of Finance, XLIII*(3), 593-616.

Baker, G., Gibbons, R., & Murphy, K. J. (1994). Subjective performance measures in optimal incentive contracts. *The Quarterly Journal of Economics, 109*(4), 1125-1156.

Bandiera, O., Barankay, I., & Rasul, I. (2005). Social preferences and the response to incentives: Evidence from personnel data. *The Quarterly Journal of Economics, 120*(3), 917-962.

Bandiera, O., Barankay, I., & Rasul, I. (2007). Incentives for managers and inequality among workers: Evidence from a firm-level experiment. *The Quarterly Journal of Economics, 122*(2), 729-773.

Bandura, A., & Schunk, D. H. (1981). Cultivating competence, self-efficacy, and intrinsic interest through proximal self-motivation. *Journal of Personality and Social Psychology, 4*(3), 586-598.

Barger, R. N. (2001). *Philosophical belief systems.* Retrieved 12 01, 2016, from University of Notre Dame: http://www3.nd.edu/~rbarger/philblfs-with-epis.html

Barnes, C. M., Hollenbeck, J. R., Jundt, D. K., DeRue, D. S., & Harmon, S. J. (2010). Mixing individual incentives and group incentives: Best of both worlds or social dilemma? *Journal of Management, 37*(6), 1611-1635.

Barro, J. (2016, September 9). *Wells Fargo's scandal is a cautionary tale about incentive pay.* Retrieved December 15, 2016, from Business Insider: http://www.businessinsider.com/wells-fargos-scandal-is-a-cautionary-tale-about-incentive-pay-2016-9

Basov, V. (2015). *True giants of mining: World's top 10 iron ore mines.* Mining.com. Retrieved from http://www.mining.com/true-giants-of-mining-worlds-top-10-iron-ore-mines/

Baumeister, R. F., & Leary, M. R. (1995). The need to belong: Desire for interpersonal attachments as a fundamental human motivation. *Psychological bulletin, 117*(3), 497-529.

Beemer, B. A., & Gregg, D. G. (2008). Advisory systems to support decision making. In F. Burstein, & C. W. Holsapple, *Handbook of Decision Support Systems* (pp. 511-528). Berlin: Springer.

Berchelmann, D. (2007). *7 steps to effective incentive compensation.* Triangle Performance, LLC. Retrieved from http://triangleperformance.com/wp-content/uploads/resources/publications/7%20Steps%20to%20Effective%20Incentive%20Compensation.pdf

Bishop, J. (1987). The recognition and reward of employee performance. *Journal of Labor Economics, 5*(4), 36-56.

Bloom, M. (1999). The performance effects of pay dispersion on individuals and organizations. *The Academy of Management Journal, 42*(1), 25-40.

Bloom, M., & Milkovich, G. T. (1998). Relationships among risk, incentive pay, and organizational performance. *The Academy of Management Journal, 41*(3), 283-297.

Borman, W. C., & Motowidlo, S. J. (1993). Expanding the criterion domain to include elements of extrarole performance. In N. Schmitt, & W. C. Borman, *Personnel selection in organizations* (pp. 71-98). San Francisco: Jossey-Bass.

Boudreau, K. J., & Lakhani, K. R. (2011). “Fit”: Field experimental evidence on sorting , incentives and creative worker performance. *Harvard Business School Working Paper*, 1-48.

Breaugh, J. A. (1985). The measurement of work autonomy. *Human Relations, 38*(6), 551-570.

Breaugh, J. A. (1999). Further investigation of the work autonomy scales: Two studies. *Journal of Business and Psychology, 13*(3), 357-373.

Burgess, S., Propper, C., Ratto, M., & Tominey, E. (2012). *Incentives in the public sector: Evidence from a government agency.* IZA Discussion Paper No. 6738.

Burstein, F., & Carlsson, S. A. (2008). Decision support through knowledge management. In F. Burstein, & C. W. Holsapple, *Handbook on Decision Support Systems 1* (pp. 103-120). Berlin: Springer.

Burstein, F., & Holsapple, C. W. (2008). *Handbook on decision support systems.* Berlin: Springer.

Bussin, M. (2008). Variable pay and choosing the right incentive scheme. Johannesburg, South Africa: 21st Century Pay Solutions Group. Retrieved from http://21centurypaysolutions.com/images/stories/variable_pay.pdf

Cai, H. (2003). A theory of joint asset ownership. *RAND Journal of Economics, 34*(1), 63-77.

Cambridge Dictionaries Online. (2017). *British english*. Retrieved from http://dictionary.cambridge.org/

Cameron, J., & Pierce, W. D. (1994). Reinforcement, reward, and intrinsic motivation: A meta-analysis. *Review of Educational Research, 64*(3), 363-423.

Campion, M. A., & Thayer, P. W. (1987). Job design: Approaches, outcomes, and trade-offs. *Organizational Dynamics, 15*(3), 66-79.

Carrell, S., & West, J. (2010). Does professor quality matter? Evidence from random assignment of students to professors. *Journal of Political Economy, 118*(3), 409-432.

CDi. (2013). *Clients*. Retrieved from CDi - Competitive Dynamics International: http://www.cdi.biz/

Cerasoli, C. P., Nicklin, J. M., & Ford, M. T. (2014). Intrinsic motivation and extrinsic incentives jointly predict performance: A 40-year meta-analysis. *Psychological Bulletin, 140*(4), 980-1008.

Che, Y., & Gale, I. (2003). Optimal design of research contests. *The American Economic Review, 93*(3), 646-671.

Chen, Q., & Jiang, W. (2006). Career concerns and the optimal pay-for-performance sensitivity. *Working paper*.

CIPD. (2015, June 18). *Bonusses and incentives*. Retrieved from CIPD: http://www.cipd.co.uk/hr-resources/factsheets/bonuses-incentives.aspx

Colvin, G. (1998, August 17). What money makes you do a lot, you say? Well, sure--everyone says that. But think again. If you're bringing industrial age attitudes about pay into the new economy, you're in trouble. *Fortune Magazine*. Retrieved from http://archive.fortune.com/magazines/fortune/fortune_archive/1998/08/17/247088/index.htm

Cornelius, N. (2001). *Human resource management: A managerial perspective, 2nd edition.* London: Thompson Learning.

Cowell, R. G., Dawid, A. P., Lauritzen, S. L., & Spiegelhalter, D. J. (2006). *Probabilistic networks and expert systems: Exact computational methods for Bayesian networks.* New York: Springer.

Crossnan, M. M., & Apaydin, M. (2010). A multi-dimensional framework of organizational innovation: A systematic review of the literature. *Journal of Management Studies, 47*(6), 1154-1191.

Datta, L. E. (1994). Paradigm wars: A basis for peaceful coexistence and beyond. *New Direction for Program Evaluation, 61*, 53-70.

De Villiers, M. R. (2005). Three approaches as pillars for interpretive information systems research: Development research, action research and grounded theory. *Proceedings of the 2005 annual research conference of the South African institute of computer scientists and information technologists on IT research in developing countries.* South African Institute for Computer Scientists and Information Technologists.

Deci, E., & Ryan, R. (1985). *Intrinsic motivation and self-determination in human behavior.* New York: Plenum.

Deci, E., Koestner, R., & Ryan, R. (1999). A meta-analytic review of experiments examining the effects of extrinsic rewards on intrinsic motivation. *Psychological Bulletin, 126*(6), 627-668.

Demming, W. (1986). *Out of the crisis.* Cambridge: Center for Advanced Engineering Study.

Dermer, J. (1975). The interrelationship of intrinsic and extrinsic motivation. *Academy of Management Journal, 18*(1), 125-129.

Dewatripont, M., Jewitt, I., & Tirole, J. (1999). The economics of career concerns, part I : Comparing information structures. *Review of Economic Studies, 66*(1), 183-198.

Dixit, A. (2002). Incentives and organizations in the public sector: An interpretative review. *The Journal of Human Resources, 37*(4), 696-727.

Dohmen, T., & Falk, A. (2011). Performance pay and multidimensional sorting: Productivity, preferences, and gender. *American Economic Review, 101*(2), 556-590.

Dooren, W. v. (2005). What makes organisations measure? Hypotheses on the causes and conditions for performance measurement. *Financial Accountability & Management, 21*(3), 363-384.

Drucker, P. F. (1986). *Management: Tasks, responsibilities, practices.* New York: Truman Talley Books.

Dysvik, A., & Kuvaas, B. (2010). Exploring the relative and combined influence of mastery-approach goals and work intrinsic motivation on employee turnover intention. *Personnel Review, 39*(5), 622-638.

Ederer, F., Holden, R., & Meyer, M. (2013). Gaming and strategic ambiquity in incentive provision. *Oxford Department of Economics Discussion Paper Series, 640*, 1-42.

Eisenberger, R., & Rhoades, L. (1999). Does pay for performance increase or decrease perceived self-determination and intrinsic motivation? *Journal of Personality and Social Psychology, 77*(5), 1026-1040.

Eisenberger, R., Armeli, S., Rexwinkel, B., Lynch, P. D., & Rhoades, L. (2001). Reciprocation of perceived organizational support. *Journal of Applied Psychology, 86*(1), 42-51.

Eisenhardt, K. M. (1989). Agency theory: An assessment and review. *The Academy of Management Review, 14*(1), 57-74.

Elrod, C., Bande, S., & Murray, S. (2013). A review of performance metrics for supply chain management. *Engineering Management Journal, 25*(3), 39-50.

Epstein, R. M., & Hundert, E. M. (2002). Defining and assessing professional competence. *JAMA, 287*(2), 226-235.

Fink, A. (2003). *The survey kit: How to ask survey questions* (2 ed., Vol. 3). SAGE Publications Ltd. doi:10.4135/9781412984393.n2

FitzRoy, F. R., & Kraft, K. (1995). On the choice of incentives in firms. *Journal of Economic Behavior & Organization, 26*, 145-160.

Folger, R., & Konovsky, M. (1989). Effects of procedural and distributive justice on reactions to pay raise decisions. *Academic Management Journal, 32*(1), 115-130.

Forbes, S., Lederman, M., & Tombe, T. (2012). Quality disclosure programs with thresholds: Misreporting, gaming and employee incentives. *University of Toronto Working Paper*.

Frank, R. (1985). *Choosing the right pond.* New York: Oxford University Press.

Fraser, J., & Gosavi, A. (2010). *What is systems engineering?* Louisville, Kentucky: American Society for Engineering Education.

Fullerton, R., & McAfee, R. (1999). Auctioning entry into tournaments. *The Journal of Political Economy, 107*(3), 573-605.

Gagne, M., & Deci, E. L. (2005). Self-determination theory and work motivation. *Journal of Organizational Behavior, 26*, 331-362.

Ganster, D. C., Fox, M. L., & Dwyer, D. J. (2001). Explaining employees' health care costs: A prospective examination of stressful job demands, personal control, and physiological reactivity. *Journal of Applied Psychology, 86*(5), 954-964.

Garbers, Y., & Konradt, U. (2014). The effect of financial incentives on performance: A quantitative review of individual and team-based financial incentives. *Journal of Occupational and Organizational Psychology, 87*(1), 102-137.

Garr, S. S. (2012). *The state of employee recognition in 2012.* Bersin and Associates.

George, J. F. (2008). The nature of organizational decision support systems. In F. Burstein, & C. W. Holsapple, *Handbook on Decision Support Systems 1* (pp. 415-432). Berlin: Springer.

George, J. M., & Brief, A. P. (1992). Feeling good-doing good: A conceptual analysis of the mood at work-organizational spontaneity relationship. *Psychological Bulletin, 112*(2), 310-329.

Gibbons, R. (1998). Incentives in organizations. *The Journal of Economic Perspectives, 12*(4), 115-132.

Gibbons, R. (2005). Incentives between firms (and within). *Mangement Science, 51*(1), 2-17.

Gibbons, R., & Murphy, K. J. (1992). Optimal incentive contracts in the presence of career concerns: Theory and evidence. *Journal of Political Economy, 100*(3), 468-505.

Gibbs, M. J., Merchant, K. A., Van Der Stede, W. A., & Vargus, M. E. (2009). Performance measure properties and incentive system design. *Industrial Relations, 48*(2), 237-264.

Goldkuhl, G. (2011). Pragmatism vs interpretivism in qualitative information systems research. *European Journal of Information Systems, 21*, 135-146.

Goldkuhl, G. (2012). Design research in search for a paradigm: Pragmatism is the answer. *Communications in Computer and Information Science, 286*, 84-95.

Goles, T., & Hirschheim, R. (2000). The paradigm is dead , the paradigm is dead... long live the paradigm: The legacy of Burrell and Morgan. *The International Journal of Management Science, 28*, 249-268.

Gous, J. H. (2014). Towards a reference architecture for integrated knowledge networks. SUNScholar. Retrieved from http://hdl.handle.net/10019.1/95799

Grant, A. M., Fried, Y., & Juillerat, T. (2010). Work matters: Job design in classic and contemporary perspectives. In S. Zedeck, *APA Handbook of Industrial and Organizational Psychology, Vol 1: Building and Developing the Organization* (pp. 417-453).

Gravelle, H., Sutton, M., & Ma, A. (2010). Doctor behaviour under a pay for performance contract: Treating, cheating and case finding? *Economic Journal, 120*(1), 129-156.

Gray, D. E. (2014). *Doing research in the real world* (3 ed.). Los Angeles | London | New Delhi | Singapore | Washington DC: Sage Publications Ltd.

Grigoriadis, C., & Bussin, M. (2007). Current practice with regard to short-term incentive schemes for middle managers. *SA Journal of Human Resource Management, 5*(1), 45-53.

Groves, T., Hong, Y., McMillan, J., & Naughton, B. (1994). Autonomy and incentives in chinese state enterprises. *The Quarterly Journal of Economics, 109*(1), 183-209.

Grund, C., & Sliwka, D. (2010). Evidence on performance pay and risk aversion. *Economics Letters, 102*, 8-11.

Guba, E. G., & Lincoln, Y. S. (1994). Competing paradigms in qualitative research. In N. K. Denzin, & Y. S. Lincoln, *Handbook of qualitative research* (pp. 105-117). Thousand Oaks, CA: Sage.

Guiso, L., & Paiella, M. (2008). Risk aversion, wealth, and background risk. *Journal of European Economic Association, 6*(6), 1109-1150.

Hackman, J. R., & Oldham, G. R. (1976). Motivation through the design of work: Test of a theory. *Organizational Behaviour and Human Performance, 16*, 250-279.

Hackman, J. R., & Oldham, G. R. (1980). *Work redesign.* Reading, MA: Addison-Wesley.

Halek, M., & Eisenhauer, J. G. (2001). Demography of risk aversion. *The Journal of Risk and Insurance, 68*(1), 1-24.

Hamilton, B. H., Nickerson, J. A., & Owan, H. (2003). Team incentives and worker heterogeneity: An empirical analysis of the impact of teams on productivity and participation. *Journal of Political Economy, 111*(3), 465-497.

Harell, G., & Daim, T. U. (2010). HDM modeling as a tool to assist management with employee motivation: The case of silicon forest. *Engineering Management Journal, 22*(1), 23-33.

Harper, C. (2015). *Organizations: Structures, processes and outcomes.* Routledge.

Harter, J. K., Schmidt, F. L., Killham, E. A., & Asplund, J. W. (2009). *Q12 meta-analysis: The relationship between engagement at work and organizational outcomes.* Washington, D.C.: Gallup Consulting. Retrieved from http://www.aamga.org/files/hr/MetaAnalysis_Q12_WhitePaper_2009.pdf

Harzing, A.-W. (2012). A preliminary test of Google Scholar as a source for citation data: A longitudinal study of Nobel Prize winners. *Scientometrics, 94*, 1057-1075.

Hassan, F. (2011). The frontline advantage. *Harvard Business Review, 5*, 107-114. Retrieved July 22, 2013, from http://hbr.org/2011/05/the-frontline-advantage/ar/1

Hazucha, J., Hezlett, S., & Schneider, R. (1993). The impact of 360-degree feedback on management skills development. *Human Resources Management, 3*(2&3), 325-351.

Heidemeier, H., & Wiese, B. S. (2014). Achievement goals and autonomy: How person-context interactions predict effective functioning and well-being during a career transition. *Journal of Occupational Health Psychology, 19*(1), 18-31.

Heneman, R. L. (2002). *Strategic reward management: Design, implementation, and evaluation.* Information Age Publishing Inc.

Heneman, R. L. (2007). *Implementing total rewards strategies: A guide to successfully planning and implementing a total rewards system.* SHRM Foundation. Retrieved from https://www.shrm.org/about/foundation/products/pages/implementingtotalrewards.aspx

Herzberg, F., Mausner, B., Peterson, R., & Capwell, D. (1957). *Job attitudes: Review of research and opinion.* Garland.

Hevner, A. R. (2007). A three cycle view of design science research. *Scandinavian Journal of Information Systems, 19*(2), 87-92.

Hevner, A. R., March, S. T., Park, J., & Ram, S. (2004). Design science in information systems research. *MIS Quarterly, 28*(1), 75-105.

Hoffman, B. J., Blair, C. A., Meriac, J. P., & Woehr, D. J. (2007). Expanding the criterion domain? A quantitative review of the OCB literature. *Journal of Applied Psycology, 92*(2), 555-566.

Holmström, B. (1979). Moral hazard and observability. *The Bell Journal of Economics, 10*(1), 74-91.

Holmström, B. (1982). Moral hazard in teams. *The Bell Journal of Economics, 13*(2), 324-340.

Holmström, B. (1999). Managerial incentive problems: A dynamic perspective. *Review of Economic Studies, 66*, 169-182.

Holmström, B., & Milgrom, P. (1987). Aggregation and linearity in the provision of intertemporal incentives. *Econometra, 55*(2), 303-328.

Holmström, B., & Milgrom, P. (1991). Multitask principal-agent analyses: Incentive contracts, asset ownership, and job design. *Journal of Law, Economics, & Organization, 24*, 24-52.

Holsapple, C. W. (2008a). Decisions and knowledge. In F. Burstein, & C. W. Holsapple, *Handbook on Decision Support Systems 1* (pp. 21-54). Berlin: Springer.

Holsapple, C. W. (2008b). DSS architecture and types. In F. Burstein, & C. W. Holsapple, *Handbook on Decision Support Systems 1* (pp. 163-190). Berlin: Springer.

Holt, C. A., & Laury, S. K. (2002). Risk aversion and incentives effects. *THe American Economic Review, 92*(5), 1644-1655.

Holtmann, M., & Grammling, M. (2005). *A toolkit for designing and implementing staff incentive schemes.* MicroSave. Retrieved from http://www.microfinancegateway.org/library/toolkit-designing-and-implementing-staff-incentive-schemes

Horizon. (2013). *Key steps to designing an incentive plan.* PPA Consulting Pty Ltd. Retrieved from http://www.horizonmg.com/Key-Steps-to-Designing-an-Incentive-Plan/pd/297/

HR-Guide.com. (2015). *Incentive Plans*. Retrieved 2016, from HR-Guide.com: http://www.hr-guide.com/data/G443.htm

Hunter, J. E., Schmidt, F. L., & Judiesch, M. K. (1990). Individual differences in output variability as a function of job complexity. *Journal of Applied Psycology, 75*(1), 28-42.

Institute of Industrial and Systems Engineers. (2016). *About IISE*. Retrieved December 07, 2016, from Institute of Industrial and Systems Engineers: http://www.iienet2.org/Details.aspx?id=282

Intellective Group. (2016). *Incentive marketplace estimate research study.* St. Louis, Missouri: Incentive Federation Incorporated. Retrieved December 2016, from http://theirf.org/research/incentive-marketplace-estimate-research-study/1836/

Jehiel, P. (2015). On transparency in organizations. *The Review of Economic Studies, 82*(2), 736-761.

Jensen, M. C., & Murphy, K. J. (1990). Performance pay and top-management incentives. *Journal of Political Economy, 98*(2), 225-264.

Jex, S. M., & Britt, T. W. (2014). *Organizational psychology: A scientist-practitioner approach* (3 ed.). John Wiley & Sons.

Kale, J. R., Reis, E., & Venkateswaran, A. (2009). Rank-order tournaments and incentive alignment: The effect on firm performance. *The Journal of Finance, 64*(3), 1479-1512.

Kamdar, D., McAllister, D. J., & Turban, D. B. (2006). "All in a day's work": How follower individual differences and justice perceptions predict OCB role definitions and behavior. *The Journal of applied psychology, 91*(4), 841-855.

Kanfer, R. (1990). Motivation theory and industrial and organizational psychology. *Handbook of industrial and organizational psychology, Vol. 1 (2nd ed.). , (pp. 75-170). Palo Alto, CA, US: Consulting Psychologists Press, xxvii, 755 pp.* .

Karau, S. J., & Williams, K. D. (1995). Social loafing: Research findings, implications, and future directions. *Current Directions in Psychological Science, 4*(5), 134-140.

Kendall, K. E., & Kendall, J. E. (2010). *Systems analysis and design.* Upper Saddle River: Prentice Hall Press.

Kiker, S., & Motowidlo, S. (1999). Main and interaction effects of task and contextual performance on supervisory reward decisions. *Journal of Applied Psychology, 84*(4), 602-609.

Kohn, A. (1993a). Why incentive plans cannot work. *Harvard Business Review, 71*(5), 54-61.

Kohn, A. (1993b). Alfie Kohn responds. *Harvard Business Review, 76*(6), pp. 48-49.

Kominis, G., & Emmanuel, C. (2005). Exploring the reward preferences of middle level managers. *Qualitative Research in Accounting & Management, 2*(1), 54-76.

Kreps, D. M. (1997). Intrinsic motivation and extrinsic incentives. *The American Economic Review, 87*(2), 359-364.

Kunz, A. H., & Plaff, D. (2002). Kunz, A. H., & Pfaff, D. (2002). Agency theory, performance evaluation, and the hypothetical construct of intrinsic motivation. *Accounting, Organizations and Society, 27*(3), 275-295.

Lambooij, M., Flache, A., & Siegers, J. (2009). Shadow of the future, risk aversion, and employee cooperation. *Rationality and Society, 21*(3), 307-336.

Latham, G. P., & Pinder, C. C. (2005). Work motivation theory and research at the dawn of the twenty-first century. *Annual review of psychology, 56*, 485-516.

Lawler, E. (1971). *Pay and organizational effectiveness: A psychological view.* New York: McGraw-Hill.

Lazear, E. (1986). Salaries and piece rates. *Journal of Business, 59*(3), 405-431.

Lazear, E. P. (2000). Performance pay and productivity. *The American Economic Review, 90*(5), 1346-1361.

Lazear, E. P., & Rosen, S. (1981). Rank-order tournaments as optimum labor contracts. *Journal of Political Economy, 89*(5), 841-864.

Lazear, E. P., & Shaw, K. L. (2007). Personnel economics: The economist's view of human resources. *Journal of Economic Perspectives, 21*(4), 91-114.

Leedy, P. D., & Ormrod, J. E. (2001). *Practical research* (9th ed.). New Jersey: Pearson Merrill Prentice Hall.

Lev, B. (2009). Book reviews. *Interfaces, 39*(3), 291-297. Retrieved from http://dx.doi.org/10.1287/inte.1080.0416

Levy, J. S. (2008). Case studies: Types, designs, and logics of inference. *Conflict Management and Peace Science, 25*, 1-18.

Loots, E., & Schutte, C. S. (2016). Primary incentive plan design considerations according to a review of key influential works. *Engineering Management Journal, 28*(4), 224-237.

MacKenzie, S., Podsakoff, P., & Fetter, R. (1993). Impact of organization behavior on citizenship evaluations of salesperson performance. *Journal of Marketing, 57*(1), 70-80.

Mann, A., & Harter, J. (2016). *The worldwide employee engagement crisis.* Retrieved December 15, 2016, from Gallup: http://www.gallup.com/businessjournal/188033/worldwide-employee-engagement-crisis.aspx

Mann, D. (2010). *Creating a lean culture: Tools to sustain lean conversions.* New York: Productivity Press.

Marinova, S., Moon, H., & Van Dyne, L. (2010). Are all good soldier behaviors the same? Supporting multidimensionality of organizational citizenship behaviors based on rewards and roles. *Human Relations, 63*(10), 1463-1485.

Maslow, A. (1943). A theory of human motivation. *Psychological Review, 50*(4), 370-396.

Mathis, R. L., & Jackson, J. H. (2002). *Human resource management: Essential perspectivs* (2 ed.). Mason: South Western.

May, M. (2013). *12.5 steps to a perfect incentive program.* Spear One. Retrieved from http://www.spearone.com/am-site/media/125-steps-to-a-perfect-incentive-program-worksheet.pdf

McCutcheon, G., & Jung, B. (1990). Alternative perspectives on action research. *Theory Into Practice, 29*(3), 144-151.

McGraw-Hill/Irwin. (2002). *Pay-for-performance-plans.* Retrieved from www.usi.edu/business/dpartrid/Mngt%20441/chap010.ppt

McGregor, D. (1960). *The human side of enterprise.* New York.

Mello, J. A. (2002). *Strategic human resource management.* South-Western, a division of Thomson Learning.

Merchant, K., Van der Stede, W., & Zheng, L. (2003). Disciplinary constraints on the advancement of knowledge: the case of organizational incentive systems. *Accounting, Organizations and Society, 28*, 251-286.

Miedema, J., van der Voort, M. C., Lutters, D., & van Houten, F. J. (2007). Synergy of technical specifications, functional specifications and scenarios in requirements specifications. In *The Future of Product Development* (pp. 235-245). Berlin Heidelberg: Springer.

Mihaly, C. (2008). *Flow: The psychology of optimal experience.* Harper Perennial Modern Classics.

Mingers, J. (2001). Combining IS research methods: Towards a pluralist methodology. *Information Systems Research, 12*(3), 240-259.

Molleman, E. (2009). Attitudes toward flexibility: The role of task characteristics. *Group & Organization Management, 34*(2), 241-268.

Morgeson, F. P., & Humphrey, S. E. (2008). Job and team design: Toward a more intergrative conceptualization of work and design. *Research in Personnel and Human Resources Management, 27*, 39-91.

Murlis, H., & Schubert, P. (2001). *Engage employees and boost performance.* Hay Group. Retrieved from http://www.haygroup.com/us/downloads/details.aspx?id=7343

Myers, M. D., & Avison, D. (2002). *An introduction to qualitative research in information systems: A reader.* London: Sage Publications.

National Academics. (2005). *Facilitating interdisciplinary research.* Washington, DC: National Academics Press.

Neely, A., Richards, H., Mills, J., Platts, K., & Bourne, M. (1997). Designing performance measures: a structured approach. *International Journal of Operations & Production Management, 17*(11), 1131-1152.

Nel, P., Werner, A., Haasbroek, G., Poisat, P., Sono, T., & Schultz, H. (2008). *Human resource management* (7 ed.). Oxford University Press.

Nelson, D., & Quick, J. (2012). *ORGB 3, student edition.* Cengage Learning.

Ng, J. Y., Lonsdale, C., & Hodge, K. (2011). The basic needs satisfaction in sport scale (BNSSS): Instrument development and initial validity evidence. *Psychology of Sport and Exercise, 12*(3), 257-264.

Nickols, F. (2009). The autonomous performer. *Performance Improvement, 48*(2), 44-48.

Noe, R. A., Hollenbeck, J. R., Gerhart, B., & Wright, P. M. (2006). *Human resource management: Gaining a competitive advantage* (5 ed.). New York: McGraw-Hill/Irwin.

OECD. (2015). *Frascati manual 2015: Guidelines for collecting and reporting data on research and experimental development.* Paris: OECD Publishing.

Olivier, M. S. (2004). *Information technology research: A practical guide for computer science and informatics* (2nd ed.). Van Schaik Publishers.

Organ, D. W. (1988). *Organizational citizenship behavior: The good soldier syndrome.* Lexington Books.

Organ, D. W., & Moorman, R. H. (1993). Fairness and organizational citizenship behavior: What are the connections? *Social Justice Research, 6*(1).

Organ, D. W., Podsakoff, P. M., & MacKenzie, S. B. (2006). *Organizational citizenship behavior: Its nature, antecedents, and consequences.* London: Sage Publications.

Orlikowski, W. J., & Baroudi, J. J. (1991). Studying information technology in organizations: Research approaches and assumptions. *Information Systems Research, 2*(1), 1-28.

Orpen, C. (1998). The effect of performance measurability on the relationship between careerist attitudes and career success. *The Journal of Social Psychology, 138*(1), 128-130.

Oyer, P. (1998). Fiscal year ends and nonlinear incentive contracts: The effect on business seasonality. *Quarterly Journal of Economics, 113*(1), 149-185.

Pacharn, P., & Zhang, L. (2006). Accounting, innovation, and incentives. *Journal of Engineering and Technology Management, 3*, 114-129.

Peffers, K., Tuunanen, T., Rothenberger, M. A., & Chatterjee, S. (2008). A design science research methodology for information systems research. *Journal of Management Information Systems, 24*(3), 45-77.

Pfeffer, J. (1998). *The human equation.* Boston: Harvard Business School Press.

Pfeffer, J., & Langton, N. (1993). The effect of dispersion on satisfaction, productivity, and working collaboratively: Evidence from college and university faculty. *Administrative Science Quarterly, 38*(3), 382-407.

Pick, R. A. (2008). Benefits of decision support systems. In F. Burstein, & C. W. Holsapple, *Handbook on Decision Support Systems 1* (pp. 719-730). Berlin: Springer.

Pink, D. H. (2009). *Drive: The surprising truth about what motivates us.* New York: Riverhead Books.

Pittaway, L., Robertson, M., Munir, K., Denyer, D., & Neely, A. (2004). Networking and innovation: A systematic review of the evidence. *International Journal of Management Reviews, 5*(3&4), 137-168.

Podsakoff, N. P., Whiting, S. W., Podsakoff, P. M., & Blume, B. D. (2009). Individual- and organizational-level consequences of organizational citizenship behaviors: A meta-analysis. *Journal of Applied Psychology, 94*(1), 122-141.

Podsakoff, P. M., MacKenzie, S. B., Bacharach, D. G., & Podsakoff, N. P. (2005). The influence of management journals in the 1980s and 1990s. *Strategic Management Journal, 26*(5), 473-488.

Podsakoff, P., MacKenzie, S., & Bommer, W. (1996). Meta-analysis of the relationships between Kerr and Jermier's substitutes for leadership and employee job attitudes, role perceptions, and performance. *The Journal of Applied Psychology, 81*(4), 380-399.

Pons, D. (2010). Expert problem sovlers. *2nd Edition*. Christchurch: University of Canterbury.

Power, D. J. (2001). Supporting decision-makers: An expanded framework. *Proceedings of Informing Science and IT Education*, (pp. 1901-1915). Krakow, Poland.

Power, D. J. (2008). Decision support systems: A historical overview. In F. Burstein, & C. W. Holsapple, *Handbook on Decision Support Systems 1* (pp. 121-140). Berlin: Springer.

Power, D. J., Sharda, R., & Burstein, F. (2015). Decision support systems. In C. L. Cooper, *Wiley Encyclopedia of Management.* John Wiley & Sons, Ltd. doi:10.1002/9781118785317.weom070211

Prendergast, C. (1999). The provision of incentives in firms. *Journal of Economic Literature, 37*(1), 7-63.

Prendergast, C. (2008). Work incentives, motivation, and identity. *American Economic Review: Papers & Proceedings, 98*(2), 201-205.

Purcell, J., & Hutchinson, S. (2007). Front-line managers as agents in the HRM performance causal chain: Theory, analysis and evidence. *Human Resource Management Journal, 17*(1), 3-20.

Purcell, J., Kinnie, N., Swart, J., Rayton, B., & Hutchinson, S. (2009). *People management and performance.* London and New York: Routledge Taylor & Francis Group.

Rabin, M. (2000). Risk aversion and expected-utility theory: A calibration theorem. *Econometrica, 68*(5), 1281-1292.

Rabin, M., & Thraler, R. (2001). Anomalies: Risk aversion. *Journal of Economic Perspectives, 15*(1), 219-232.

Reichheld, F. (2003). The one number you need to grow. *Harvard Business Review, 81*(12), 46-55.

Reilly, P., Smither, J., & Vasilopoulos, N. (1996). A longitudinal study of upward feedback. *Personal Psychology, 4*(3), 599-612.

Rhoades, L., & Eisenberger, R. (2002). Perceived organizational support: A review of the literature. *Journal of Applied Psychology, 87*(4), 698-714.

Rioux, S., & Penner, L. (2001). The causes of organizational citizenship behavior: A motivational analysis. *Journal of Applied Psychology, 86*(6), 1306-1314.

Ross, S. A. (2004). Compensation, incentives, and the duality of risk aversion and riskiness. *The Journal of Finance, LIX*(1), 207-225.

Ryan, R. M., & Deci, E. L. (2000a). Intrinsic and extrinsic motivations: Classic definitions and new directions. *Contemporary Educational Psychology, 25*, 54-67.

Ryan, R. M., & Deci, E. L. (2000b). Self-determination theory and the facilitation of intrinsic motivation, social development, and well-being. *The American Psychologist, 55*(1), 68-78.

Ryan, R. M., & Deci, E. L. (2002). An overview of self-determination theory: An organismic-dialectical perspective. In E. L. Deci, & R. M. Ryan, *Handbook of Self-determination Research* (pp. 3-33). Rochester, NY: The University of Rochester Press.

Rynes, S., Gerhart, B., & Parks, L. (2005). Personnel psychology: Performance evaluation and pay for performance. *Annual Review of Psychology, 56*, 571-600.

Salamon, S., & Deutsch, Y. (2006). OCB as a handicap: An evolutionary psychological perspective. *Journal of Organizational Behaviour, 27*, 185-199.

Saraceno, T. (2016). *How to entangle the universe in a spider web*. Retrieved from Tomás Saraceno: http://tomassaraceno.com/

Schay, B. W., & Fisher, S. F. (2013). The challenge of making performance-based pay systems work in the public sector. *Public Personnel Management, 42*(3), 359-384.

Schweyer, A. (2011). *The use of rewards & recognition in driving engagement.* Enterprise Engagement Alliance. Retrieved from http://theirf.org/research/the-use-of-rewards-recognition-in-driving-engagement/1068/

Scott, D., McMullen, T., Royal, M., & Stark, M. (2010). *The impact of rewards on employee engagement.* Scottsdale, Arizona USA: WorldatWork.

Shalley, C. A., Gilson, L. L., & Blum, T. C. (2009). Interactive effects of growth need strength, work context, and job complexity on self-reported creative performance. *Academy of Management Journal, 52*(3), 489-505.

Sheldon, K. M., & Filak, V. (2008). Manipulating autonomy, competence, and relatedness support in a game-learning context: New evidence that all three needs matter. *The British Journal of Social Psychology, 47*, 267-283.

Siemsen, E., Balasubramanian, S., & Roth, A. V. (2007). Incentives that induce task-related effort, helping, and knowledge sharing in workgroups. *Management Science, 53*(10), 1533-1550.

Smith, A. (1776). *An inquiry into the nature and causes of the wealth of nations.* New York: The Modern Library.

Sprague, R. H. (1980). A framework for the development of decision support systems. *MIS Quarterly, 4*(4), 1-26.

Starcke, K., & Brand, M. (2012). Decision making under stress: A selective review. *Neuroscience and Biobehavioral Reviews, 36*, 1228-1248.

Steenburgh, T. J. (2008). Effort or timing: The effect of lump-sum bonuses. *Quantitative Marketing and Economics, 6*, 235-256.

Stevenson, B. (2011). *Shock discovery – middle managers drive organizational performance*. Retrieved August 29, 2013, from BRAVATRAK: The leadership improvement tool: http://www.bravatrak.com/shock-discovery-middle-managers-drive-organizational-performance/

Stewart, B., Appelbaum, E., Beer, M., Lebby, A. M., Amabile, T., McAdams, J., . . . Wolters, D. S. (1993). Rethinking rewards. *Harvard Business Review, 71*(6), pp. 37-46. Retrieved 05 27, 2017, from https://hbr.org/1993/11/rethinking-rewards

Stiglitz, J. E. (1975). Incentives, risk, and information: Notes towards a theory of hierarchy. *The Bell Journal of Economics, 6*(2), 552-579.

Stolovich, H. (2010). *Incentives, motivation and workplace performance: Research & best practices.* The Incentive Research Foundation. Retrieved from http://theirf.org/research/incentives-motivation-and-workplace-performance-research-and-best-practices/147/

Stroh, E. (2001). Personnel motivation: Strategies to stimulate employees to increase performance. *Politeia, 20*(2), 59-74.

SurveyMonkey. (2016). *The likert scale explained*. Retrieved October 19, 2016, from SurveyMonkey: https://www.surveymonkey.com/mp/likert-scale/

Tahlin, M. (2011). Vertical differentiation of work tasks: Conceptual and measurement issues. *Empirical Research in Vocational Education and Training, 3*(1), 55-70.

Tashakkori, A., & Teddlie, C. (1998). *Mixed methodology: Combining qualitative and quantitative approaches.* London: Sage.

Taylor, F. W. (1903). *Shop management.* The American Society of Mechanical Engineers.

Taylor, F. W. (1911). *The principles of scientific management.* Harper.

The Incentive Marketing Association. (2015). *The incentive program*. Retrieved March 19, 2015, from Incentive Marketing Assocaion: http://www.incentivemarketing.org/?page=DevelIncentProg

The VisionLink Advisory Group. (2009). *Ten steps to building an effective incentive plan.* Retrieved from http://www.vladvisors.com/webinars/ten-steps-to-building-an-effective-incentive-plan

The Wall Street Journal. (1997). Frederick Taylor, early century management consultant. Retrieved May 2014, from http://www.cftech.com/BrainBank/TRIVIABITS/FredWTaylor.html

Times Higher Education. (2011). *Citation averages, 2000-2010, by fields and years*. Retrieved April 2014, from Times Higher Education: http://www.timeshighereducation.co.uk/415643.article

Torrance, H. (2012). Triangulation, respondent validation, and democratic participation in mixed methods research. *Journal of Mixed Methods Research, 6*(2), 111-123.

Triangle Performance, LLC. (2007). *7 steps to effective incentive compensation.* Retrieved from http://triangleperformance.com/wp-content/uploads/resources/publications/7%20Steps%20to%20Effective%20Incentive%20Compensation.pdf

Trochim, W. M. (2006). *Philosophy of research*. Retrieved November 2016, from The Research Methods Knowledge Base: http://www.socialresearchmethods.net/kb/index.php

U.S. Department of Labour. (1991). *Revised handbook for analyzing jobs.* Washington, DC: Government Printing Office.

University of Minnesota. (2013). *Merit pay planning and implementation guide.* Retrieved from https://www1.umn.edu/ohr/prod/groups/ohr/@pub/@ohr/@toolkit/documents/asset/ohr_asset_454690.pdf

VisionLink. (2009). *Ten steps to building an effective incentive plan.* Irvine: The VisionLink Advisory Group. Retrieved from http://www.vladvisors.com/webinars/ten-steps-to-building-an-effective-incentive-plan

Wageman, R., & Baker, G. (1997). Incentives and cooperation: The joint effects of task and reward interdependence on group performance. *Journal of Organizational Behaviour, 18*, 139-158.

Weibel, A., Rost, K., & Osterloh, M. (2009). Pay for performance in the public sector—benefits and (hidden) costs. *Journal of Public Administration Research and Theory, 20*, 387-412.

Weiss, A. (1987). Incentives and worker behavior: Some evidence. *NBER Working Paper No. 2194*.

Welch, J., & Byrne, J. A. (2003). *Straight from the gut* (Reprint ed.). Grand Central Publishing.

Wiley, C. (1997). What motivates employees according to over 40 years of motivation surveys. *International Journal of Manpower, 18*(3), 263-280.

WorldatWork. (2015). *Trends in employee recognition.* WorldatWork. Retrieved December 2016, from https://www.worldatwork.org/adimLink?id=78679

Yin, R. K. (2009). *Case study research: Design and methods* (4 ed.). SAGE Publication, Inc.

Zahedi, F., Song, J., & Jarupathirun, S. (2008). Web-based decision support. In F. Burstein, & C. W. Holsapple, *Handbook on Decision Support 1* (pp. 315-338). Berlin: Springer.

Appendices

Appendix A – The Descriptive Lists of Nodes

This appendix contains the final descriptive lists of nodes. An overview of where a particular list of nodes can be found is indicated in Figure A-1:

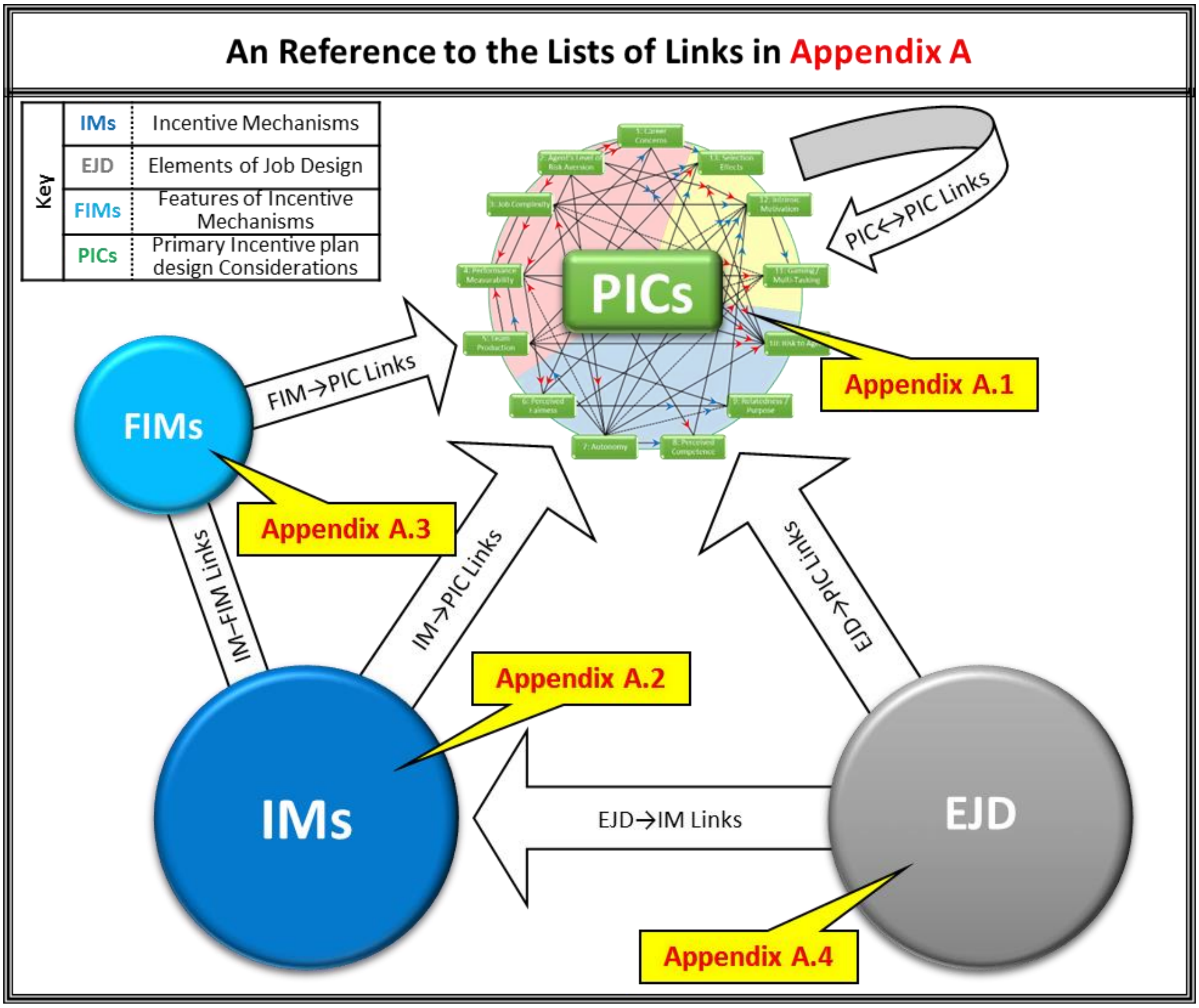


Figure A-1: A reference to the lists of links in Appendix A

Appendix A.1 – A Description of the Primary Incentive Plan Design Considerations (PICs)

This appendix contains a description of the 13 PICs as identified in Chapter 5 and discussed in Chapter 5.5 specifically. Figure 5-12 shows the 13 PICs with each PIC's designation, this can be used to refer to the descriptive list that follows.

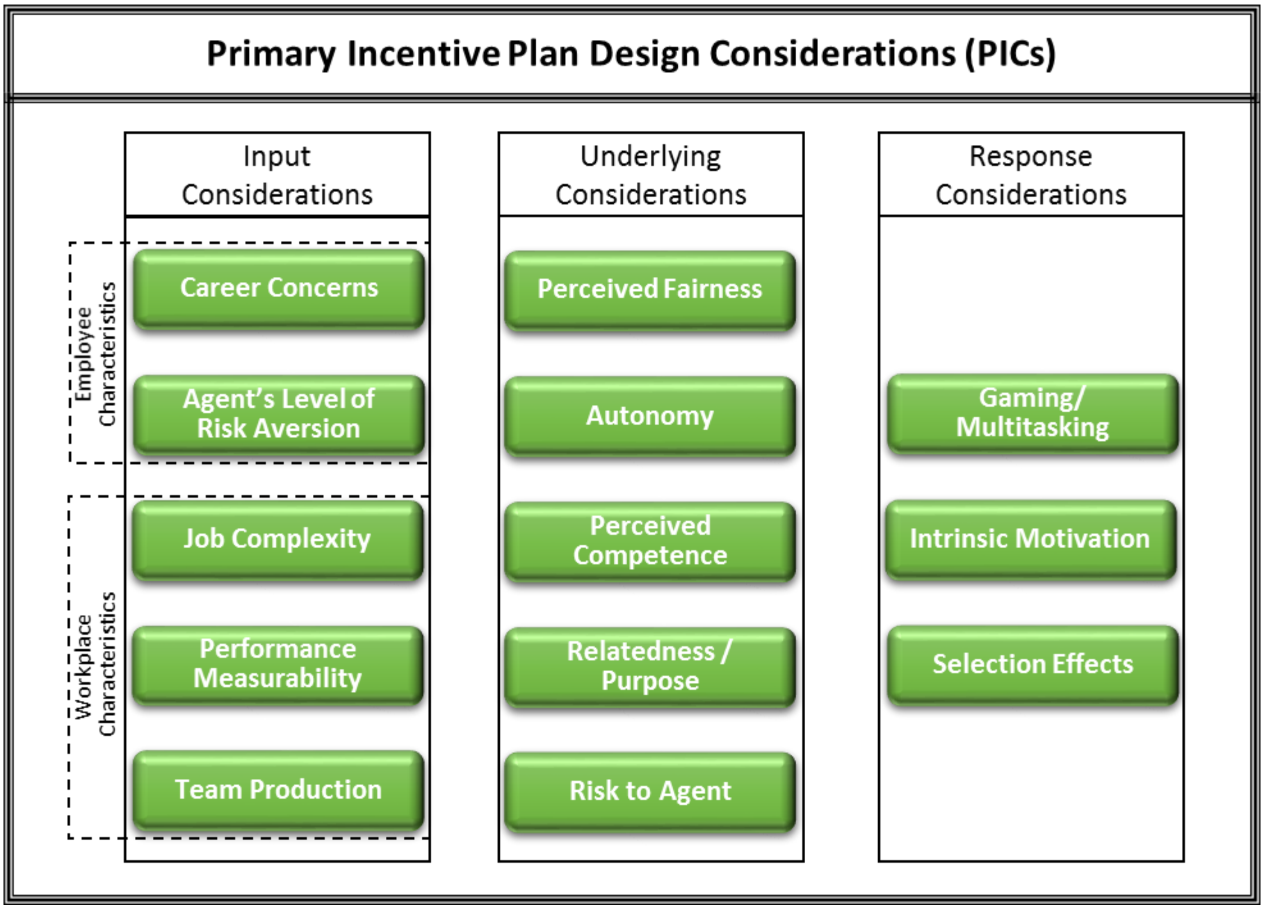


Figure 5-12: Primary Incentive Plan Design Considerations (PICs) with designations

The format of the list, followed by the list of PICs, is as follows:

[Node Designation]: [Name of PIC]

[Short Definition]

[Further description and motivation]

- [Factors/Influences to Consider]
- ❖ [Dangers and Complications]

PIC1: Career Concerns (Employee)

"Concerns about the effects of current performance on future compensation" (Gibbons & Murphy, 1992, p. 468)**.**

Career Concerns is "concerns about the effects of current performance on future compensation" (Gibbons & Murphy, 1992, p. 468). In other words, "agents exert effort not just to maximize current pay but also to affect the perceptions of others" (Prendergast, 1999, p. 51). Gibbons and Murphy (1992, p. 469) go on to describe where Career Concerns arise frequently: "They occur whenever the (internal or external) labour market uses a worker's current output to update its belief about the worker's ability and then base future wages on these updated beliefs".

- Time to Retirement: "Career concerns are stronger when a worker is further from retirement because a longer prospective career increases the return to changing the market's belief. A worker who is further from retirement thus is willing to take more costly unobservable actions in an attempt to influence the market's belief" (Gibbons & Murphy, 1992, p. 469).
- Time on Job: "When workers begin in their positions, little is known about them, so that productivity realizations have significant effects on perceptions of ability ...This is not true after tenure is accumulated, because much is already known about workers, and there is less time over which to generate a reputation. Thus effort levels fall over time" (Prendergast, 1999, p. 53).
- Level of Extrinsic Incentive Plan: Career Concerns are particularly strong where formal incentive plans are crude and constrained (Dewatripont, Jewitt, & Tirole, 1999).
- Visibility: Agents have reputational concerns. "Elections, promotions, and future employment in the private sector are major motivations to expend effort in the current job" (Dewatripont, Jewitt, & Tirole, 1999, p. 183). Visibility inside the firm enables the hope for Promotions while visibility outside the firm enables the hope for future private sector employment. If an agent does not perceive the agent's actions as visible this mechanism will not be effective.
- Reputation: "A manager is concerned about both the market's perception of his ability and the variation in such perception" (Chen & Jiang, 2006, p. 29).
- Ambition: Ambition is one of the drivers behind Career Concerns. If an individual is ambitious, has a hope of 'reaching higher levels', dreams of climbing further up the ladder; then the effectiveness of Career Concerns is magnified.

❖ Career Concerns typically use relative performance measures. Similar to tournament theory this can lead to situations where agents exert less effort as "the more that is known about ability, the less reason to exert effort for career concern reasons" (Prendergast, 1999, p. 54).

❖ "Managers typically work too hard in early years (while the market is still assessing the manager's ability) and not hard enough in later years" (Gibbons & Murphy, 1992, p. 469).

❖ "The analysis above shows that career concerns induce a genuine incongruity in risk preferences between the firm and the manager" (Holmström, 1999, p. 179).

PIC2: Agent's Level of Risk Aversion (Employee)

The reluctance of a person to accept a bargain with an uncertain payoff rather than another bargain with a more certain, but possibly lower, expected payoff (Adapted from Key Influential Works).

This consideration is specifically focused on how the agent or employee feels about or responds to risk. The focus is on risk aversion instead of something like 'risk characteristics' as 11 out of the 20 Key Influential Works refer to 'risk aversion' while none of them refers to 'employee risk characteristics'. Risk aversion is the reluctance of a person to accept a bargain with an uncertain payoff rather than another bargain with a more certain, but possibly lower, expected payoff. Authors accept that the assumption of a 'risk neutral' agent does not hold, expected utility is accepted as an ex-hypothesis (Rabin & Thraler, 2001). There is thus a risk involved with assuming risk neutrality as there is clear evidence for risk aversion even with low stakes, which increases with higher stakes (Holt & Laury, 2002; Rabin & Thraler, 2001).

- Level of Risk Aversion: This is extremely hard to determine; many factors are known to have an influence, yet the degree, value, or magnitude of risk aversion is very difficult to measure (Grund & Sliwka, 2010, p. 8): "although risk aversion plays a crucial role in the story, it is not directly observable". Some factors with notable generalisations include:
    - Wealth: "The consensus view is that absolute risk aversion should decline with wealth" (Guiso & Paiella, 2008, p. 1110). See also Ross (2004) and Halek & Eisenhauer (2001).
    - Gender: For both pure and speculative risks, as with previous research, Halek & Eisenhauer (2001, p. 22) find that "Women are significantly more risk averse than men".
    - Education: "Education increases one's aversion to pure risk but also increases the willingness to accept a speculative risk" (Halek & Eisenhauer, 2001, p. 22).
- Stake Size: Risk aversion increases with larger stakes (Holt & Laury, 2002). This goes wider than just monetary amounts. Consider the level of knowledge about an employee as an example, "If talent is not fully known, investment decisions [performance] become tests that provide information about talent. Perceptions about talent, in turn, determine the manager's future opportunity wage and this is what makes investments risky from the manager's perspective even if income is not explicitly tied to profits" (Holmström, 1999, p. 178).
- Loss aversion and perceived baselines: "... people are significantly more averse to losses relative to the status quo than they are attracted by gains" (Rabin, 2000, p. 1288). Solving this problem is not as simple as providing only positive incentives, the agent can shift the agent's perceived baseline. The agent now assesses risk from the vantage point of being wealthier (Ross, 2004).

❖ Variation between agent and principal's risk preferences: "the principal and the agent may prefer different actions because of the different risk preferences" (Eisenhardt, 1989, p. 58). Agents may thus be too cautious or seek too many risks.

PIC3: Job Complexity (Job)

A measure of the complexity associated with a specific job or "the skill requirements of a job's work tasks" (Tahlin, 2011, p. 55)**.**

Complexity is defined by the Oxford dictionary as "The state or quality of being intricate or complicated". Job Complexity simply describes the difficulty versus simplicity of a job (Grant, Fried, & Juillerat, 2010). It is thus a measure of the complexity associated with a specific job or "the skill requirements of a job's work tasks" (Tahlin, 2011, p. 55). Typically, manual labour would be regarded as low-complexity jobs and managerial/professional work as high complexity jobs.

- Required Cognitive Capacity: "Job complexity is the level of cognitive capacity needed in order to carry out the daily work tasks of a job in a satisfactory manner" (Tahlin, 2011, p. 56).
- Autonomy: Analysts at the United States Department of Labour developed a dictionary of occupational titles (DOT). To determine complexity they considered Autonomy, routine, and decisions latitude (Shalley, Gilson, & Blum, 2009):
    - Autonomy: The more complex a job is the more Autonomy we expect an agent to have. As you move up the organisational hierarchy standard work percentages decrease with the increase in Job Complexity. David Mann recommends that 80% of front-line supervisors', 50% of middle managers' and 25% of senior managers' time be covered by their leader standard work (Mann D. , 2010).
    - Routine: Routine is more or less an inverse function of Autonomy. Typically, jobs with less Autonomy have more routine and vice versa. While this holds in general we also have to consider prefigured routines (Nickols, 2009). Some jobs inherently require a lot of routine; this still allows space for the employee to decide, design, or alter the routine. In other cases the employee might have no choice, the employee is given a prefigured work routine.
    - Decision Latitude: Decision latitude is the ability to make work-related decisions (Ganster, Fox, & Dwyer, 2001). It seems to be part of Autonomy, specifically decision Autonomy. Autonomy can be found on various levels such as Functional Autonomy, Decision Autonomy, Structural Autonomy, and Strategic Autonomy.
- Education and Training Requirements: "Job complexity can be validly and reliably measured by asking workers about the educational and training requirements for the work they do" (Tahlin, 2011, p. 56).
- Data-People-Things (DPT): Worker actions are grouped into data, people, and things. A job's complexity can thus be gauged based on the complexity of these items (U.S. Department of Labour, 1991).

❖ Strong connection with Gaming/Multitasking.

<u>PIC4: Performance Measurability (Job)</u>

A measure of the ease and accuracy with which an individual's performance on a specific job can be measured (Adapted from Key Influential Works).

Performance Measurability refers to the ease and accuracy with which the performance of an employee can be measured. Choosing which quantity or quantities to use in an incentive contract, is a central problem in agency theory (Baker G. P., 1992).

- Comprehensiveness of quantitative indicators: Quantitative measures are objective and generally more reliable than subjective assessments, yet they are often also typically less comprehensive. The degree and availability of quantitative measures will influence the balance between subjective and objective performance measures (Garbers & Konradt, 2014; Rynes, Gerhart, & Parks, 2005).
- Job Complexity, Routine, and Ambiguity: An increase in Job Complexity will typically reduce the availability and comprehensiveness of quantitative indicators. "In organisations with a high ambiguity and a low routine, measurement of output is more difficult" (Dooren, 2005, p. 372).
- Controllability and Conditional Controllability: "To determine whether a measure is useful for contracting, a common and intuitive notion is that a manager should be responsible for what he controls" (Pacharn & Zhang, 2006, p. 116). This is Traditional Controllability Principle. The complete picture is however more intricate; as a result it can be helpful to look beyond what the agent directly controls to gain a better understanding of the agent's performance (Holmström, 1979, p. 75). This is referred to as conditional controllability.
- Quality of Performance Measuring System: There are various factors influencing how easy and accurately performance can be measured. The act of measuring performance is however a complex endeavour. "Inadequately designed performance measures can result in dysfunctional behaviour often due to the method of calculation encouraging individuals to pursue inappropriate courses of action" (Neely, Richards, Mills, Platts, & Bourne, 1997, p. 1131). Yet while these inadequate performance measures can cause much harm, "Organizations that have borne in mind the behavioural ramifications when designing performance measures are few and far between" (Neely, Richards, Mills, Platts, & Bourne, 1997, p. 1133). It can be argued, or rather not denied, that the quality of a performance-measuring system greatly increases the effectiveness of an incentive plan. Managers should try to improve the quality of performance measures where possible, yet if they are not able they should take the state of the performance measures into account when incentive plans are designed. Some aspects determining the quality of measurements are (Gibbs, Merchant, Van Der Stede, & Vargus, 2009):
    - Noise or uncontrollable risk (risk that the agent cannot react to)
    - Controllable risk (environmental uncertainty that the agent can react to)
    - Distortion (Measures may also be distorted because their weight misallocates the agent's efforts on different tasks)
    - Manipulability (the extent to which the performance measure can be manipulated)
- ❖ Strong connection with Gaming/Multitasking.
- ❖ Incomplete or not comprehensive: "The performance measures upon which rewards are based may aggregate highly disparate aspects of performance into a single number and omit other

aspects of performance that are essential if the firm is to achieve its goals" (Holmström & Milgrom, 1991, p. 50).

- ❖ Theft: "One danger of assessments that are subject to manipulation is that a principal will underreport performance in order to save on wages" (Prendergast, 1999, p. 29).
- ❖ Compression of Ratings: "Supervisors distort subjective performance ratings by not sufficiently differentiating good from bad performance in their ratings" (Prendergast, 1999, p. 30).

PIC5: Team Production (Job)

Considerations related to incentivising groups or individuals with a considerable level of Task Interdependence (Adapted from Key Influential Works).

Many employees spend part of their efforts on individual projects and part on Team Production. Team Production refers to a settings where output measures are not the outcome of the inputs of a single individual, but rather derive from the joint contributions of many individuals (Prendergast, 1999). In such setting there is typically a high degree of Task Interdependence which is "the degree to which an individual's task performance depends upon the efforts or skills of others" (Wageman & Baker, 1997, p. 141). While team settings are vulnerable to phenomena such as free riding (Prendergast, 1999) it is also noted that beneficial social factors come into play: "Individuals will perform actions for their team that they would be unwilling to perform strictly for themselves" (Babcock, Bedard, Charnes, Hartman, & Royer, 2011, p. 26).

- Degree of Task Interdependence: "When task interdependence is high there will be a strong need for team members to help one another and to mutually adjust efforts" (Molleman, 2009, p. 248).
- Observability: "Team production problems potentially arise in situations where individual contributions to output cannot be easily identified and compensation must be based on team production" (Prendergast, 1999, p. 40).
- Internal Monitoring: One of the big challenges facing Team Production, the free-rider problem, can be "attenuated when team members can effectively monitor and punish their peers" (Hamilton, Nickerson, & Owan, 2003, p. 469).
- Team size: "Free riding will be less serious in smaller teams or when workers engage in closely related activities" (Hamilton, Nickerson, & Owan, 2003, p. 470).
- ❖ "There is considerable evidence of free riding in teams" (Prendergast, 1999, p. 9).
- ❖ "Low-ability workers could expect that teaming up with higher-ability workers would raise their pay. However, since high-ability workers would think the opposite way, this creates an adverse selection problem" (Hamilton, Nickerson, & Owan, 2003, p. 467).

PIC6: Perceived Fairness

The experience of fair treatment by the organisation (Adapted from Key Influential Works).

Perceived Fairness refers to the experience of fair treatment by the organisation. The literature identifies a clear link between Perceived Fairness, especially in terms of procedural justice or interactional justice, on the levels of occupational citizenship behaviour (OCB) (Kamdar, McAllister, & Turban, 2006). Kamdar's definition of OCB is compatible with the definition of Discretionary Behaviour (DB) specified in this research, "Work related behaviour outside the domain of traditional task statements that promotes the effective functioning of the organisation". As OCB or DB is a key driver of overall organisational performance it is crucial that Perceived Fairness is considered when incentive plans are developed.

- Transparency: Transparency affects an agent's perception of fairness (Gagne & Deci, 2005, p. 354). When incentive plans fail it is often due to a lack of trust due to perceived unfairness or lack of system transparency (Schay & Fisher, 2013, p. 361). On the other hand high levels of transparency, especially in situations where the agent has superior information, often leads to dysfunctional behavioural responses, specifically gaming. It is suggested that limiting transparency can help deter gaming; this reasoning is extensive, dating back to at least Bentham in 1830 (Ederer, Holden, & Meyer, 2013). As a result there is a trade-off between being transparent and withholding some information (Jehiel, 2015). Factors such as superior knowledge by the agent and scope for gaming would have to be considered when designing the level of transparency.
- Trust: "Numerous observers of organizational pay practices have noted that trust between workers and supervisors is essential if subjective performance assessment systems are to be successful" (Baker, Gibbons, & Murphy, 1994, p. 1127). "Trust is a set of beliefs about the veracity, honesty, and length of horizon of an individual, and the predictability and reliability of his or her future actions" (Baker, Jensen, & Murphy, 1988, p. 599).
    - Reneging: "Reneging on one implicit contract may affect other implicit contracts" (Baker, Gibbons, & Murphy, 1994, p. 1142).
    - Favouritism: "workers do not trust subjective performance evaluation when they feel that supervisors indulge in favoritism" (Baker, Gibbons, & Murphy, 1994, p. 1153).
    - Degree of Subjectivity: "The more subjective the measure, the higher the degree of trust needed, because without high trust there is little chance that the subordinate will believe that his pay is really fairly based on performance." (Baker, Jensen, & Murphy, 1988, p. 598).
- Horizontal Pay Equity: "There is a large behavioural literature arguing that treating employees differently from each other is detrimental to employee morale" (Baker, Jensen, & Murphy, 1988, p. 596).
    - Teamwork: "Where cooperation among workers is important, we should expect to see less wage differentiation" (Holmström & Milgrom, 1991, p. 28).
- It is interesting to note that Transparency, Trust, and Horizontal Pay Equity align very well with the literature on Procedural Justice, Interactional Justice, and Distributive Justice.

❖ High levels of transparency, especially in situations where the agent has superior information, often leads to dysfunctional behavioural responses, specifically gaming.

PIC7: Autonomy

"Autonomy involves feeling internal assent regarding one's behaviour, rather than feeling controlled or pressured" (Sheldon & Filak, 2008, p. 267)**.**

"Autonomy involves acting with a sense of volition and having the experience of choice" (Gagne & Deci, 2005, p. 333). In other words Autonomy refers to "being the perceived origin or source of one's own behaviour" (Ryan & Deci, 2002, p. 8). Lastly on a more practical note, "Autonomy involves feeling internal assent regarding one's behaviour, rather than feeling controlled or pressured" (Sheldon & Filak, 2008, p. 267). This is in line with older definitions of work Autonomy, such as that of Hackman & Oldham (1976, p. 258): "The degree to which the job provides substantial freedom, independence, and discretion to the individual in scheduling the work and in determining the procedures to be used in carrying it out." Note that Autonomy is not the same as or to be confused with Task Interdependence. Consider the following scenario (adapted from Breaugh, 1985): A bus driver has little, if any, control over his/her work. He/she is told when to start his/her route, what time he/she is expected at each stop, when to take a rest break, and what route to follow. Yet the driver operates on his/her own every day. He/she experiences high levels of task independence, but low levels of Autonomy. Autonomy and Task Interdependence are clearly not one and the same.

- Method Autonomy: "The degree of discretion/choice individuals have regarding the procedures/methods they utilize in going about their work" (Breaugh J. A., 1999, p. 359).
- Scheduling Autonomy: "The extent to which workers feel they can control the scheduling/sequencing/timing of their work activities" (Breaugh J. A., 1999, p. 360).
- Criteria Autonomy: "The degree to which workers have the ability to modify or choose the criteria used for evaluating their performance" (Breaugh J. A., 1999, p. 360).
- Team Autonomy: "Ample research has shown that people working in self-organized teams are more satisfied than those working in inherited teams" (Pink, 2009, p. 106).

❖ High levels of Autonomy without high levels of Intrinsic Motivation in the face of imperfect information leaves the door wide open for slacking and other dysfunctional responses. "Whether workers make effective use of Autonomy may depend on individual motivational states" (Heidemeier & Wiese, 2014, p. 21).

PIC8: Perceived Competence

"Feeling efficient, effective, and even masterful in one's behaviour, rather than incompetent and ineffective" (Sheldon & Filak, 2008, p. 267)**.**

Competence refers to "feeling effective in one's ongoing interactions with the social environment and experiencing opportunities to exercise and express one's capacities" (Ryan & Deci, 2002, p. 7) or on a more practical level "feeling efficient, effective, and even masterful in one's behaviour, rather than incompetent and ineffective" (Sheldon & Filak, 2008, p. 267). This is very different from measures of professional competency such as that Epstein and Hundert proposed by building on prior definitions in a study that seeks to define professional competence, "professional competence is the habitual and judicious use of communication, knowledge, technical skills, clinical reasoning, emotions, values, and reflection in daily practice for the benefit of the individual and community being served" (Epstein & Hundert, 2002, p. 226). The focus is not on the employee's level of competence, but rather a satisfaction of the basic psychological need for competence. "Interpersonal events and structures (e.g., rewards, communications, feedback) that conduce toward 'feelings of competence' during action can enhance intrinsic motivation" (Ryan & Deci, 2000a, p. 58). The aim of the model in this area would be to help employees to 'feel' as competent as possible. This is related to 'mastery' or 'self-efficacy'.

- Competency Signals: Sending Positive Feedback signals can lift an employee's level of Perceived Competence (Aparicio, Vela, Sanchez, & Montes, 2012; Eisenberger & Rhoades, 1999). Incentives can also serve as Positive Feedback. One noteworthy aspect of competence in regard to Intrinsic Motivation is that extrinsic motivation can stimulate Intrinsic Motivation by providing positive competency signals (Bandura & Schunk, 1981; Wiley, 1997; Deci, Koestner, & Ryan, 1999; Rynes, Gerhart, & Parks, 2005). As a result, rewards that are subject to completion, for example, carry a positive message as they imply some level of competence, yet employees have to complete the task and might feel 'controlled' – lowering levels of perceived Autonomy and hence Intrinsic Motivation. Recognising sub-goal attainments can similarly be used to improve Intrinsic Motivation (Bandura & Schunk, 1981).
- Perceived Organisational Support (POS): POS is thought to contribute to employees' feelings of competence and worth by conveying the organisation's positive valuation of an employee's work and care for the employee's well-being (Rhoades & Eisenberger, 2002; Eisenberger, Armeli, Rexwinkel, Lynch, & Rhoades, 2001; George & Brief, 1992).
- Optimal Challenges: People seek challenges that are in line with their abilities in order to improve and maintain their skills (Dysvik & Kuvaas, 2010; Mihaly, 2008; Ng, Lonsdale, & Hodge, 2011). An employer needs to design work that is challenging enough but not too complicated for specific employees.
- Opportunity for Growth: In line with optimal challenges, employees need to be provided with opportunities for acquiring new knowledge or skills (Dysvik & Kuvaas, 2010; Mihaly, 2008; Ng, Lonsdale, & Hodge, 2011).

❖ A balance has to be found between stimulating an employee's level of Perceived Competence and addressing issues or giving necessary critique.

PIC9: Relatedness/Purpose

"Feeling meaningfully connected to others, rather than feeling alienated or ostracized" (Sheldon & Filak, 2008, p. 267)**.**

Relatedness refers to "feeling connected to others, to caring for and being cared for by those others, to having a sense of belongingness both with other individuals and with one's community" (Ryan & Deci, 2002, p. 7) or on a more practical level "feeling meaningfully connected to others, rather than feeling alienated or ostracized" (Sheldon & Filak, 2008, p. 267). "As a fundamental motivation, the need to belong should stimulate goal-directed activity designed to satisfy it" (Baumeister & Leary, 1995, p. 500). This need for relatedness is crucial for internalisation (Gagne & Deci, 2005, p. 337). This is similar to the need for 'purpose' as defined by Pink. Pink argues that the most deeply motivated people "hitch their desires to a cause larger than themselves" (Pink, 2009, p. 133). This consideration is thus not focused specifically on Task Interdependence, which is "the degree to which an individual's task performance depends upon the efforts or skills of others" (Wageman & Baker, 1997, p. 141), but rather on how an individual can be made to feel like they are a valued member of a team and serve a purpose.

- Feeling cared about: Creating an environment where the employee perceives the organisation as empathetic towards employees' well-being.
- Friendships and feeling accepted: "As a fundamental motivation, the need to belong should stimulate goal-directed activity designed to satisfy it" (Baumeister & Leary, 1995, p. 500).
- A sense of purpose: "To infuse people's tasks and goals with a sense of higher purpose—above and beyond the economic or strategic goals of the company" (Hassan, 2011, p. 113).

❖ Employees who do not experience a sense of relatedness or purpose have a decreased level of Intrinsic Motivation.

❖ Catering for Relatedness/Purpose can have efficiency trade-offs.

PIC10: Risk to Agent

The amount of risk that an employee will be exposed to in term of inherent risk and risk imposed by the incentive plan (Adapted from Key Influential Works).

This consideration is concerned with the amount of risk that an employee or agent will be exposed to. Incentive plans should account not only for effort, but also risk considerations; compensation and incentive plans should be structured to induced effort whilst, whenever possible, minimise the risk shifted onto agents (Bloom & Milkovich, 1998).

- Incentives: The primary constraint on incentives is that their provision imposes additional risk on workers (Prendergast, 1999).
- Uncertainties: Uncertainties that "may disrupt the link between effort investment and future rewards" inherently increase the associated risk (Lambooij, Flache, & Siegers, 2009, p. 310).
- Common Risks: Relative performance evaluation is used as a means of filtering out common risk from compensation packages (Prendergast, 1999). "Government policies, economic climate, competitor actions, technological change, and so on, may cause uncontrollable variations in outcomes" (Eisenhardt, 1989, p. 61).

❖ Imposing unwanted risk is "costly to firms through higher wages" (Prendergast, 1999, p. 8).

PIC11: Gaming/Multitasking

The "exploitation of an incentive scheme by an agent [employee] for his own self-interest, to the detriment of the objectives of the incentive designer" (Ederer, Holden, & Meyer, 2013, p. 1)**.**

Gaming involves "optimizing with respect to actual instead of intended measures" (Baker, Jensen, & Murphy, 1988, p. 597) or more clearly it is the "exploitation of an incentive scheme by an agent for his own self-interest, to the detriment of the objectives of the incentive designer" (Ederer, Holden, & Meyer, 2013, p. 1). It is a dysfunctional behavioural response where "agents emphasize only those aspects of performance that are rewarded" (Prendergast, 1999). Following Holmström and Milgrom (1991) gaming is also referred to as multitasking (Prendergast, 1999). As it is virtually impossible to truly capture performance holistically for non-trivial tasks, performance measures only regard a subset of overall performance (Prendergast, 1999, p. 8). The introduction of incentives requires performance measures. There is no way to completely inhibit all possibilities of gaming. Incentive plan designers must thus take great care to reduce the opportunities for gaming. While this applies not only to incentive plans, but to any contract or agreement, the nature of an incentive plan makes it more susceptible to gaming. Adverse or unwanted effects can take place due to a multitude of factors; that is part of the reason that the 13 PICs are important in the first place. This PIC, Gaming/Multitasking, focuses on the agent consciously undermining the incentive plan.

- Performance Measurability and Job Complexity: The possibilities for gaming inherently increase as Job Complexity increases. This is closely tied to the fact that it is more difficult to holistically measure the performance of employees in more complex jobs. As a job becomes more complex it also becomes more likely that an agent will have superior knowledge which makes it easier for the agent to game the system. It does not seem unreasonable to conclude that as Job Complexity increases the complexity associated with providing for gaming considerations also increases.
- Specific ways that employees game a system, or forms of Gaming, are identified as (Ederer, Holden, & Meyer, 2013, p. 1):
    - Effort Diversion: "Diversion of effort away from activities that are socially valuable but difficult to measure and reward, towards activities that are easily measured and rewarded."
    - Exploitation of Classification Rules: "Exploitation of the rules of classification to improve apparent, though not actual, performance."
    - Timing Distortions: "Distortion of choices about timing and/or pricing to exploit temporarily high monetary rewards even when socially efficient choices have not changed."
- Social Loafing is a reduction in motivation and effort when individuals work collectively (Karau & Williams, 1995; Garbers & Konradt, 2014; Barnes, Hollenbeck, Jundt, DeRue, & Harmon, 2010). This phenomena is also known as the 1/N problem since each agent receives this share of output in a partnership with N members (Prendergast, 1999). Social loafing is a big problem in team or work groups. It is, however, still relevant in any incentive situation where the performance of an individual is not purely due to the individual's own output, but to that of others as well. Social loafing is affected by:

  - Team size: Team size is one of, if not the, primary variable influencing social loafing (Karau & Williams, 1995, p. 139).
  - Peer pressure: Various authors have suggested that the free-rider problem can be mitigated by increasing peer pressure and mutual monitoring which also increases individual incentives (Wageman & Baker, 1997; FitzRoy & Kraft, 1995). In and of itself this would probably not suffice, as the benefit for enforcing peer pressure is also shared via the 1/N ratio.
  - Input and Design considerations: The individual, his/her Career Concerns and level of risk aversion, will have an influence on how likely free riding is to be a problem for the individual. Job parameters, such as Job Complexity, Performance Measurability, and Team Production setting will determine how easy it is for an individual to get away with free riding. Drivers for Intrinsic Motivation such as Autonomy, Competence, and Mastery are also expected to have a significant influence on how likely an individual is to 'shirk' on the job. In short "the answer as to whether to use individual, group, or organization-wide incentives depends crucially on the design on the work done by team members" (Wageman & Baker, 1997, p. 142).
- Imperfect Measures and Misspecification: Gaming involves "optimizing with respect to actual instead of intended measures" (Baker, Jensen, & Murphy, 1988, p. 597) and misspecifying the performance measure in an objective system results in resourceful employees gaming the system again by optimizing with respect to actual instead of intended measures (Baker, Jensen, & Murphy, 1988). The more actual and intended measures are out of sync, the larger the scope for gaming.
- Superior Knowledge: "The reason is that the scientist is able to game the number of patents produced, using his superior knowledge to work too hard on the easy ones and not hard enough on the hard ones" (Baker G. P., 1992, p. 609).
- Rent Seeking Activities: "Any actions that agents carry out that are designed to increase the likelihood of better ratings from supervisors, but that have less value on surplus than some other activity that they could carry out" (Prendergast, 1999, p. 31). "To pursue advancement through image management, social relationships, and personal manipulation rather than by means of effective performance" (Orpen, 1998, p. 128).

PIC12: Intrinsic Motivation

"The inherent tendency to seek out novelty and challenges, to extend and exercise one's capacities, to explore, and to learn" (Ryan & Deci, 2000b, p. 70)**.**

Intrinsic Motivation is defined as "The inherent tendency to seek out novelty and challenges, to extend and exercise one's capacities, to explore, and to learn" (Ryan & Deci, 2000b, p. 70). Intrinsic Motivation is key to Self Determination Theory (SDT) and Occupational Citizenship Behaviour (OCB) or Discretionary Behaviour (DB). SDT argues that we have innate psychological needs and that when those needs are satisfied, we're motivated, productive, and happy; but when they're thwarted, our motivation, productivity, and happiness plummet (Pink, 2009). This Response Consideration, Intrinsic Motivation, is not only focused on creating Intrinsic Motivation. Stimulating Intrinsic Motivation is important, but is covered in the three design considerations: Autonomy, Perceived Competence, and Relatedness/Purpose (Pink, 2009; Ryan & Deci, 2000b). This response consideration seeks to ensure that Intrinsic Motivation is preserved; not thwarted as Dan Pink warns or crowded out as Deci puts it. Cognitive Evaluation Theory (CET) suggests that extrinsic rewards can undermine Intrinsic Motivation (Gagne & Deci, 2005, p. 332). It must be noted that extrinsic and intrinsic rewards are not additive, but can be both positively and negatively interactive (Gagne & Deci, 2005, p. 332). One example of an extrinsic reward enhancing Intrinsic Motivation is rewards that are positively informational; they are predicted to provide satisfaction of the need for competence (Deci, Koestner, & Ryan, 1999, p. 628).

- Crowding out: Many authors argue that external factors such as tangible rewards, deadlines, surveillance, and evaluations prompt a change in perceived locus of causality from internal to external, and undermine Intrinsic Motivation (Gagne & Deci, 2005). The same authors, in addition to many others, agree however that extrinsic and Intrinsic Motivation are both valuable and can be positively informational. This is a controversial topic with authors such as Kohn concluding that extrinsic motivators should not be used at all while economists generally agree that external incentives are very potent. Despite concerns and arguments against the use of incentives, most organisations use it in some form. Moreover, this use appears to be growing, rather than declining (Rynes, Gerhart, & Parks, 2005). A model must be able to guide designers to diminish the crowding out effects if it seeks to be pragmatic. This would be primarily with regard to:
  - Autonomy: "Autonomy involves acting with a sense of volition and having the experience of choice" (Gagne & Deci, 2005, p. 333). See Consideration 7.
  - Perceived Competence: Perceived Competence refers to "feeling effective in one's ongoing interactions with the social environment and experiencing opportunities to exercise and express one's capacities" (Ryan & Deci, 2002, p. 7). See Consideration 8.
  - Relatedness/Purpose: Relatedness refers to "feeling connected to others, to caring for and being cared for by those others, to having a sense of belongingness both with other individuals and with one's community" (Ryan & Deci, 2002, p. 7). See Consideration 9.

❖ "Extrinsic rewards can undermine intrinsic motivation" (Ryan & Deci, 2000b, p. 70), "strategies that focus primarily on the use of extrinsic rewards do, indeed, run a serious risk of diminishing rather than promoting intrinsic motivation" (Deci, Koestner, & Ryan, 1999, p. 659).

PIC13: Selection Effects

"The impact of PFP [Pay for Performance] on the attributes of the workforce through differential attraction and retention processes" (Rynes, Gerhart, & Parks, 2005, p. 582)**.**

Selection or Sorting Effects is sometimes described as a secondary effect of incentive plans. In addition to individuals raising their levels of performance, compensation contracts have Selection Effects, with higher piece rates being relatively more attractive to better workers (Lazear E. , 1986). More recently it has been defined as "the impact of PFP [Pay for Performance] on the attributes of the workforce through differential attraction and retention processes" (Rynes, Gerhart, & Parks, 2005, p. 582). Incentive pay thus affects the supply of workers, namely when workers or managers are offered incentive pay, they self-select into jobs where they expect their compensation to be higher (Bandiera, Barankay, & Rasul, 2007). "This means that group-based pay may also have unfavorable sorting effects, causing the highest performers to choose alternative opportunities where individual results will be rewarded more heavily" (Rynes, Gerhart, & Parks, 2005, p. 585). More intricate sorting effects also come into play: "the particular institutional details of incentive schemes will attract different kinds of workers and generate sorting, thereby affecting the composition of the workforce" (Boudreau & Lakhani, 2011, p. 2). Take Risk Aversion for example, "more risk averse individuals seem to apply for jobs where performance contingent wages are less likely" (Grund & Sliwka, 2010, p. 8).

- Employee's level of Risk Aversion: Selection Effects will be influenced by an employee's level of risk aversion. Rewards that have a lot of risk associated with them will limit the self-selection of risk averse individuals.
- Fit (Desired worker characteristics): "Firms and workers achieve fit when a worker's skill set, broadly understood, is matched to the firm that values it the most" (Lazear & Shaw, 2007, p. 110). Different remuneration strategies will appeal to workers with different skill sets.
- ❖ Adverse selection: Individuals can apply for jobs that are attractive whilst they may not be ideally suited. This is a hazard especially in situations with imperfect information (Lazear & Rosen, 1981). "Everyone prefers to play in the "major leagues;" all workers prefer to work in firms with the best workers – therefore tournament structures naturally require credentials and other nonprice signals to differentiate people and assign them to the appropriate contest" (Lazear & Rosen, 1981, p. 858).

Appendix A.2 – A Description of the Types of Incentive Mechanisms (IMs)

This appendix contains a description of the types of Incentive Mechanisms (IMs) and their significant subcategories as identified in Chapter 6. Figure 6-5 shows the IMs with each IM's designation, this can be used to refer to the list that follows.

IM1 - Piece Rates/Commission

IM2 - Performance Bonuses

- IM2.1 - Gainsharing
- IM2.2 - Profit-sharing

IM3 - Employee Ownership

- IM3.1 - Stock Options
- IM3.2 - Employee Stock Ownership Plans (ESOPs)
- IM3.3 - Asset Ownership

IM4 - Salary

- IM4.1 - Merit Pay
- IM4.2 - Efficiency Wages
- IM4.3 - Deferred Compensation

IM5 - Recognition

- IM5.1 - Positive Feedback

IM6 - Autonomy

IM7 - Promotions

- IM7.1 - Dismissals

Figure 6-5: Typical Incentive Mechanisms and their significant subcategories

Note that the definitions are not accompanied by extensive descriptions. In order to reduce repetition the reader is referred to the Cascading Effects Models (CEMs) that can be found in Chapter 15.3, and the related IM–FIM Links that can be found in Appendix B.4.

The format of the list, followed by the list of IMs, is as follows:

[Node Designation)] [Name of IM]
[Definition] [Location of more information]
[Timing]

- Notable Strengths or Weaknesses (not related to PICs directly).

IM1) Piece Rates/Commission
A way of paying individuals for work that is based on a fixed rate according to a physical measurement of units produced or actions performed. For more information refer to CEM-IM1, and links IM–FIM1, 2, 3, and 4.
Timing: Paid with wages.

IM2) Performance Bonuses
A once-off bonus in addition to base pay based on an assessment of performance. For more information refer to CEM-IM2, and links IM–FIM5, 6, 7, 8, and 9.
Timing: Various.

- Strength (ongoing cost reduction): "Generally, bonuses are less costly to the employer than other pay increases because they do not become part of employee's base wages, upon which future percentage increases are figured" (Mathis & Jackson, 2002, p. 123).

IM2.1) Performance Bonuses – Gainsharing
A Performance Bonus based on group or unit performance where employees share financially in the gain or improvement. For more information refer to CEM-IM2.1, and links IM–FIM10, 6, 8, and 11.
Timing: More frequently than annually, monthly or quarterly if possible (Noe, Hollenbeck, Gerhart, & Wright, 2006, p. 516; Mathis & Jackson, 2002, p. 126; HR-Guide.com, 2015).

IM2.2) Performance Bonuses – Profit-sharing
A system where a portion of organisational profits are shared with employees. For more information refer to CEM-IM2.2, and links IM–FIM12, 6, 8, and 13.
Timing: Usually annually but can be deferred (Mathis & Jackson, 2002, p. 127; HR-Guide.com, 2015).

- Weakness (causality concerns): "Although there is consistent support for a correlation between Profit-sharing payments and profits, questions have been raised about the direction of causality" (Noe, Hollenbeck, Gerhart, & Wright, 2006, p. 512).

IM3) Employee Ownership

Employee Ownership refers to the ownership of a company, directly or indirectly, in part or in whole by some or all of its employees. For more information refer to CEM-IM3, and links IM–FIM14, 15, 16, and 17.

Timing: Various.

- Weakness (line-of-sight): "The link between pay and performance" is low, and "less motivational the larger the organization". Lower level employees who "may see much less opportunity to influence overall organization performance" are less motivated by ownership (Noe, Hollenbeck, Gerhart, & Wright, 2006, p. 514).
- Weakness (reliant on company doing well): "It has worked only as long as the enterprise is doing well" (Drucker P. F., 1986, p. 137).

IM3.1) Employee Ownership – Stock Options

A stock option that gives employees the opportunity to buy the company's stock at a previously fixed price. For more information refer to CEM-IM3.1, and links IM–FIM14, 18, 16, and 17.

Timing: Stock Options can last up to ten years, limit is determined by the organisation (HR-Guide.com, 2015).

- Weakness (not effective in down market): "In a down market, because they quickly become valueless" and "Dilution of ownership" (CIPD, 2015).

IM3.2) Employee Ownership – Employee Stock Ownership Plans (ESOPs)

An Employee Ownership program that provides a company's workforce with an ownership interest in the company. For more information refer to CEM-IM3.2, and links IM–FIM14, 15, 16, and 17.

Timing: This is an equity based Deferred Compensation plan, vesting requirement can vary. Typically leaving the company or retirement (HR-Guide.com, 2015).

- Strength (financial benefits): "The firm can receive favourable tax treatment of the earnings earmarked for use in the ESOP" (Mathis & Jackson, 2002, p. 127) and "tax and financial advantages and can serve as a takeover defence" (Noe, Hollenbeck, Gerhart, & Wright, 2006).

IM3.3) Employee Ownership – Asset Ownership

The ownership of necessary assets by employees as opposed to the organisation. For more information refer to CEM-IM3.3, and links IM–FIM14, 15, 16, and 17.

Timing: Ongoing.

IM4) Salary

A fixed regular payment, typically paid on a monthly basis, made by an employer to an employee, especially a professional or white-collar worker. For more information refer to CEM-IM4, and links IM–FIM19, and IM–FIM20.

Timing: Various.

IM4.1) <u>Salary – Merit Pay</u>

An increase in basic pay determined by an assessment of individual performance. For more information refer to CEM-IM4.1, and links IM–FIM21, 24 26, 19, and 20.

Timing: Usually annually.

- Strength (malleability): It is able to "define and reward a wide range of performance dimensions" (Noe, Hollenbeck, Gerhart, & Wright, 2006, p. 505).
- Weakness (ongoing costs): "It [the raise or base salary increase] does not have to be re-earned, and the cost to the organization grows over time, perhaps more than either the employee's performance or the organization's profitability would always warrant" (Noe, Hollenbeck, Gerhart, & Wright, 2006, p. 509).

IM4.2) <u>Salary – Efficiency Wages</u>

The practice of paying employees higher than market rates to make their jobs more valuable to them. For more information refer to CEM-IM4.2, and links IM–FIM22, 22, 19, and 20.

Timing: With commencement of employment usually advertised in advance.

- Weakness (added cost): "The disadvantage [of paying above the market average], however, is the added cost" (Noe, Hollenbeck, Gerhart, & Wright, 2006, p. 466).

IM4.3) <u>Salary – Deferred Compensation</u>

An arrangement where a portion of an employee's income is paid out at a later date after which the income was actually earned sometimes leading to workers being overpaid when they are old at the cost of being underpaid when they are young. For more information refer to CEM-IM4.3, and links IM–FIM23, 25, 19, and 20.

Timing: Deferred.

IM5) <u>Recognition</u>

The expressed appreciation for an employee's behaviours, activities, or impact in an organisation in the form of simple gestures as well as symbolically through the receiving of an award. For more information refer to CEM-IM5, and links IM–FIM27, 28, 29, and 30.

Timing: Various.

IM5.1) <u>Recognition – Positive Feedback</u>

Providing employees with positive verbal feedback regarding their performance effectiveness. For more information refer to CEM-IM5.1, and links IM–FIM27, 28, 31, and 30.

Timing: Frequently, not only once a year (Noe, Hollenbeck, Gerhart, & Wright, 2006, p. 368).

IM6) <u>Autonomy</u>

Increasing an employee's level of Autonomy as a reward for good performance. For more information refer to CEM-IM6, and links IM–FIM33, 33, 34, and 35.

Timing: Undefined.

IM7) Promotions

The advancement of an employee's rank or position in an organisational hierarchy system. For more information refer to CEM-IM7, and links IM–FIM36, 37, 38, and 38.

Timing: Dependent on the availability of positions.

- Weakness (requires organisational growth: “Another important problem with promotion-based reward systems is that they require organizational growth to feed the reward system” (Baker, Jensen, & Murphy, 1988, p. 600).
- Weakness (suboptimal resource allocation): “The best performer at one level in the hierarchy is [in many cases] not the best candidate for the job one level up” (Baker, Jensen, & Murphy, 1988, p. 602).

IM7.1) Promotions - Dismissals

The termination of employment by an employer against the will of the employee. For more information refer to CEM-IM7.1, and links IM–FIM36, 40, 41, and 42.

Timing: Undefined.

Appendix A.3 – A Description of the Features of Incentive Mechanisms (FIMs)

This appendix contains a description of the Features of Incentive Mechanisms (FIMs) as introduced in Chapter 6.5. The four FIMs and their designations are shown below, this can be used to refer to the descriptive list that follows.

FIM1) Performance Measures (objective or subjective).
FIM2) Performance Requirements (linear and non-linear, plus FIM2.1: tournaments/relative).
FIM3) Reward Types (tangible or intangible).
FIM4) Target Audience (individual or team based).

The format of the list, followed by the list of FIMs, is as follows:

[Node Designation)] [Name of FIM]: [Extreme 1 – Extreme 2]
[Short Description]: [More Details]

- [Extreme 1]
  - [Opportunities/Strengths]
  - [Threats/Weaknesses]
- [Extreme 2]
  - [Opportunities/Strengths]
  - [Threats/Weaknesses]

FIM1) Performance Measures: Objective – Subjective
The means through which performance is measured: Performance measures can be objective or subjective, and is often a mixture of the two. This is due to both types having strengths and weaknesses. Hence "many firms mitigate the effects of distortionary objective performance measures by augmenting objective measures with subjective assessments of performance" (Baker, Gibbons, & Murphy, 1994, p. 1126). "The weight placed on subjective measures of performance should increase in the noisiness of the objective measures, while the weight on objective measures obviously falls" (Prendergast, 1999, p. 20).

- Objective or Explicit Performance Measures: Objective or Explicit Performance Measures refers to measures where performance is objectively ascertained. Such a measure might be the number of units produced with adjustments made for factors such as quality and schedules. This leads to a situation where "Objective measures are characterized by the fact that they can be verified for contractual purposes" (Prendergast, 1999, p. 12).
  - Opportunities/Strengths: Objective measures are not prone to fairness or reneging concerns and can be verified for contractual purposes.

- Threats/Weaknesses: An increase in Job Complexity will typically reduce the availability and comprehensiveness of quantitative indicators (Dooren, 2005, p. 372). It follows that "Complex jobs will typically not be evaluated through explicit contracts" (Prendergast, 1999, p. 9). As "Specifying the correct objective measure of employee performance is often impossible" (Baker, Jensen, & Murphy, 1988, p. 598) objective measure can often not be used. When they are used there is a danger of "resourceful employees 'gaming the system' by optimizing with respect to actual instead of intended measures" (Baker, Jensen, & Murphy, 1988, p. 597) or of employees focusing "too much on those aspects of the job included in the contract to the detriment of those that are excluded" (Prendergast, 1999, p. 21).

- <u>Subjective or Discretionary Performance Measures</u>: Subjective or Discretionary Performance Measures refers to measures where performance is not objectively, but instead subjectively measured. Such a measure might be a performance rating by an employee's supervisor. "A subjective measure is anything that is not verifiable to a third party" (Prendergast, 1999, p. 12).
    - Opportunities/Strengths: "Subjective assessments have the benefit that they can be a more fully rounded measure of performance" (Prendergast, 1999, p. 9) and "may play a crucial role in determining future compensation, promotions, and continued employment, even where current compensation does not involve incentive pay of any kind" (Gibbons, 1998, p. 121).
    - Threats/Weaknesses: "While an explicit contract can be enforced by a court, an implicit contract cannot, and so is vulnerable to reneging by the firm" (Baker, Gibbons, & Murphy, 1994, p. 1127). This is a concern as "Subjective performance evaluation procedures are subject to systematic cognitive biases in evaluation and might be considered as procedurally unfair as they cannot provide consistency and objectivity in the same way as objective evaluations do" (Weibel, Rost, & Osterloh, 2009, p. 405). Perceived Fairness becomes a concern as "there is a danger of the firm underreporting performance in order to save wages" (Prendergast, 1999, p. 37) hence "the more subjective the measure, the higher the degree of trust needed, because without high trust there is little chance that the subordinate will believe that his pay is really fairly based on performance." It is thus not surprising that "numerous observers of organizational pay practices have noted that trust between workers and supervisors is essential if subjective performance assessment systems are to be successful" (Baker, Gibbons, & Murphy, 1994, p. 1127).

FIM2) Performance Requirements: Linear – Non-linear

The level of performance required to earn a reward: The required performance to earn a reward can be set at a certain threshold or require a certain quota, or the reward can be proportionally tied to performance. As both linear and non-linear incentive plans have certain strengths and weaknesses it is found that "in practice we often see a combination, where the payment schedule has a break at a threshold level, and linear rewards or penalties on either side of it. Such a scheme combines the merits and drawbacks of the two pure types" (Dixit, 2002, p. 700). An alternative approach, tournaments, is discussed in FIM2.1.

- Linear Schemes (Piece Rates, Percentages): Linear schemes are those schemes where the remuneration, reward, or bonus is directly proportional to performance. "Such [linear] schemes are often used in practice for their simplicity and relative robustness against manipulation" (Dixit, 2002, p. 698). Piece Rates would be the typical example, variations can include forms of sales commission or situations where a percentage of a certain metric, often profit, is paid as a bonus. Piece Rates work best in situations where "workers carry out simple jobs, in the sense that aggregate measures of performance are available" (Prendergast, 1999, p. 17).
- Non-linear Schemes (Quotas, Thresholds): Non-linear schemes or step functions are those schemes that set performance targets and rewards or punishes based on meeting them or not. While "the optimal contract is linear only under very special assumptions" it must be noted that gaming is "a natural consequence of nonlinear contracts" (Gibbons, 2005, p. 3). Some examples include maintenance availability targets, production quotas, or the threat of firing a manager when the agency's performance falls below a set level.
    - Threats/Weaknesses: Various opportunities for Gaming/Multitasking exist:
        - Waiting until the last minute: "If individuals are rewarded on aggregates over long time periods, they may have an incentive to wait 'until the last minute' simply for discounting reasons" (Prendergast, 1999, p. 25).
        - Slacking: "An agent who is close to winning the prize will have greater incentive than one who has either exceeded the quota or is unlikely to reach that quota" (Prendergast, 1999, p. 26). This occurs because "step function schemes provide no incentives at the margin within the regions of outputs above x_0 [the threshold] and below x_0" (Dixit, 2002, p. 700).
        - Timing: Certain actions can be scheduled or manipulated so that they fall in the next or current period. This allows non-linear schemes to be gamed in various ways; consider scenarios where a large maintenance project can be done in the next period if the availability figures of the current period is near the threshold, or in the current year if the availability figures of the current period is safely above the threshold.

FIM2.1) Performance Requirements – Relative (Tournaments)

- **Relative performance is measured, as opposed to absolute performance**: A situation where "earnings depend on rank order among a group of workers" (Lazear & Rosen, 1981, p. 842). "Tournament theory considers a group of agents competing for a fixed set of prizes. The prizes are specified in advance and agents exert effort to increase the likelihood of winning a better prize. Rather like a sports game, all that matters for winning is not the absolute level of performance, but how well one does relative to others" (Prendergast, 1999, p. 34). Tournament incentives are driven by prize size and the probability of success (Kale, Reis, & Venkateswaran, 2009).
    - Opportunities/Strengths: Tournaments work well where rank is easier to measure or observe than absolute performance (Lazear & Rosen, 1981).
    - Threats/Weaknesses: Tournaments only effect top employees as "Incentives will be absent for employees who clearly fall short of the promotion standard or who cannot conceivably win a promotion tournament" (Baker, Jensen, & Murphy, 1988, p. 600). There is also a risk of Gaming/Multitasking as "A problem with tournaments is that since individuals are evaluated on how well they do relative to others, they are unlikely to help their competitors in need" (Prendergast, 1999, p. 35).

FIM3) Reward Type: Tangible – Intangible

The type of reward associated with an incentive: Rewards can take many forms and can be either tangible or intangible, incentive plans often incorporate a range or combination of both. Many types of rewards have tangible and intangible components, consider rewards like; Ownership, Promotions, or Recognition Plans with tangible rewards. Note that the seven IMs are all extrinsic rewards. This holds even for IM5 and IM6 (Recognition and Autonomy). While the form of the reward for IM5 and IM6 drives PICs that stimulate Intrinsic Motivation the locus of control still lies outside of the agent: if you do a good job you will receive recognition (be it tangible or intangible), if you do a good job you will be granted more Autonomy. This is not to say that Intrinsic Motivation is not important, in fact 5 of the PICs (PIC6, PIC7, PIC8, PIC9, and PIC12) focus on Intrinsic Motivation. These PICs are provided for through Job Design and ensures the introduction of Incentive Mechanisms will not ignore them and crowd them out.

- Tangible Rewards: Tangible rewards, sometimes called transactional rewards, refers to those rewards that have a monetary value that can be easily ascertained; examples include cash bonuses, salary increases, and any physical reward such as gift cards or gym membership.
    - Threats/Weaknesses: The chief danger that should be noted in this regards is that incentive pay can have a negative effect on Intrinsic Motivation, a "crowding-out" effect (Gagne & Deci, 2005).
- Intangible Rewards: Intangible rewards, sometimes called relational rewards, refers to those rewards that do not have a clear monetary value; examples include praise or non-financial recognition, granting various forms of Autonomy, or providing career development opportunities.

FIM4) Target Audience: Individual – Group

The employees who are the subject/s of an incentive plan: A specific mechanism typically targets an individual, group, or the entire organisation (Mathis & Jackson, 2002, p. 122). Both individual and team based incentives have strengths and weaknesses; incentive plans typically use a combination.

- Individual based incentives: An individual is targeted, typical examples are Piece Rates or Bonuses.
    - Opportunities/Strenghths and Threats/weaknesses: See group-based incentives, the inverse applies.
- Group-based incentives: A group, team, or section is targeted, gainsharing is the most prominent example. This can extend to a situation where the entire organisation is targeted, typical examples are Profit-sharing and Stock Options.
    - Strenghths:
        - Team based systems stimulates cooperation (FitzRoy & Kraft, 1995; Holmström & Milgrom, 1991; Prendergast, 1999).
        - With team based systems employees have an incentive to monitor each other and exert positive peer pressure (Baker, Jensen, & Murphy, 1988; FitzRoy & Kraft, 1995; Prendergast, 1999).
        - Often team based performance measures are more accurate (Garbers & Konradt, 2014) while "individual contributions to output cannot be easily identified" (Prendergast, 1999, p. 39).
        - "Team-based incentives are often more useful in practice than individual incentives because they are easier to administer to a team than to each member" (Garbers & Konradt, 2014, p. 107).
    - Threats/Weaknesses:
        - Team based systems are suspect to the free-rider or 1/n problem (Baker, Jensen, & Murphy, 1988; FitzRoy & Kraft, 1995; Prendergast, 1999).
        - Moving to team based systems "Gives rise to problems when workers vary in their ability" (Prendergast, 1999, p. 41).
    - Trade-Offs:
        - Moving to team based systems "Improves the performance of those who were less productive on individual schemes but decreases that of the more productive" (Prendergast, 1999, p. 41).

Appendix A.4 – A Description of the Elements of Job Design (EJD)

This appendix contains a description of the 22 Elements of Job Design (EJD) as identified in Chapter 7. Figure 7-7 shows the 22 EJD with each EJD's designation, this can be used to refer to the descriptive list that follows. The descriptions are not meant to be comprehensive, but detailed enough to give the reader a basic understanding of what the EJD are and how they function. The definitions and descriptions are, unless stated otherwise, sourced from Morgeson & Humphrey (2008, pp. 51-68).

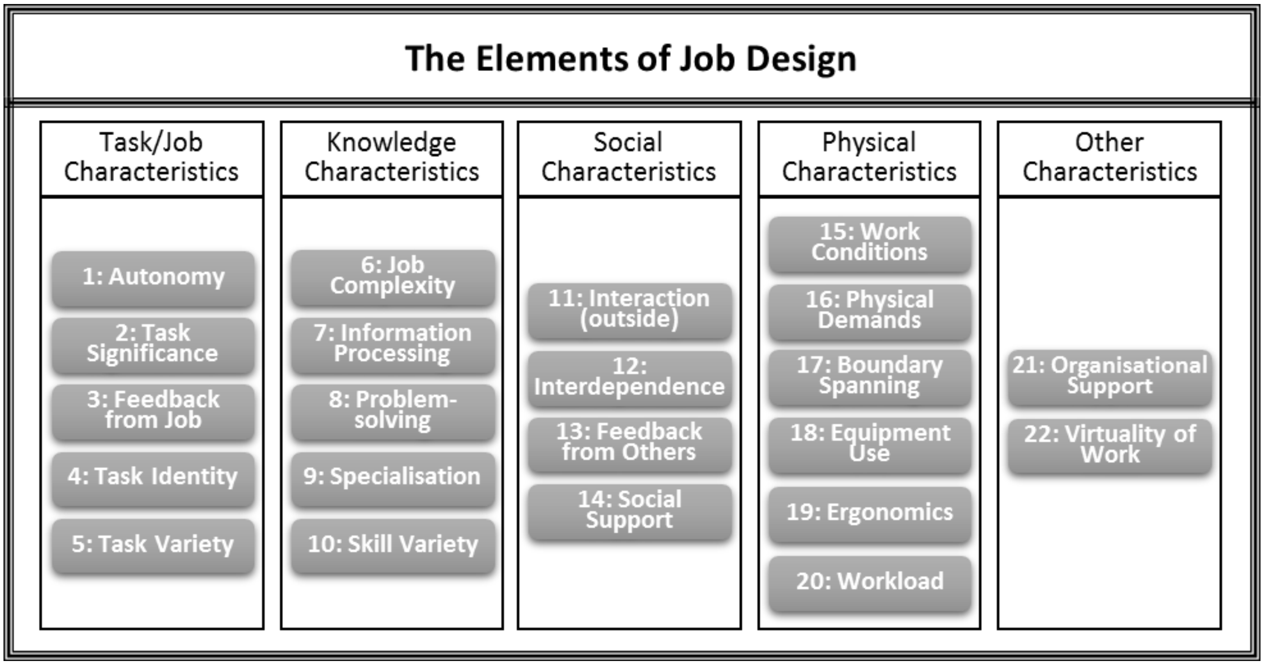


Figure 7-7: The Elements of Job Design (EJD)

The format of the list, followed by the list of EJD, is as follows:

[Node Designation)] [<u>Name of EJD</u>]

[Short Definition] [Additional Information]

- [What the EJD is linked or associated with]

EJD1) <u>Autonomy</u>

"The freedom an individual has in carrying out work." It is "The most studied and generally the most influential [of task characteristics]." Three types are work scheduling Autonomy, work methods Autonomy, and decision-making Autonomy.

- Linked to both objective and subjective ratings, lower absenteeism, positive well-being outcomes, reduced role ambiguity and conflict, increased job satisfaction, increased organisational commitments, and increased internal motivation.

EJD2) Task Significance

"The degree to which a job impacts the lives of others, both inside and outside the organization."

- Linked to increased job satisfaction, increased organisation commitment, increased work motivation, increased subjective performance ratings, lower burnout, and increased perceptions of overload.

EJD3) Feedback from Job

"The extent to which a job imparts information about an individuals' [sic] performance." "Timely feedback is central to motivational theories such as goal setting."

- Linked to increased work motivation, increased job satisfaction, increased role ambiguity, increased role conflict, and increased anxiety.

EJD4) Task Identity

"The extent to which an individual completes an entire piece of work." Thought to instil pride in the worker and keep the worker motivated.

- Linked to increased worker motivation, increased organisational commitment, increased job satisfaction, increased subjective performance evaluation, decreased absenteeism, decreased role conflict, and decreased burnout.

EJD5) Task Variety

"The extent to which employees are required to execute a large variety of tasks on the job." "Expected to make a job more interesting and enjoyable." "Can often overwhelm individuals."

- Linked to increased job satisfaction, increased subjective performance ratings, and increased perception of job overload.

EJD6) Job Complexity

"The extent to which a job is multifaceted and difficult to perform."

- Linked to higher subjective performance ratings, higher levels of job satisfaction and job involvement, and higher levels of perception of overload.

EJD7) Information Processing

"The extent to which a job necessitates an incumbent to focus on and manage information."

- Limited research but linked to increased perception of job satisfaction, increased compensation, and increased training requirements.

EJD8) Problem-solving

"The extent to which unique ideas or solution are needed in a job."

- Limited research suggests it is both satisfying and demanding for the worker.

EJD9) Specialisation

"The degree to which specialized tasks are performed, or specialized knowledge and skill is needed for job performance."

- Limited research but linked to increased job satisfaction and increased efficiency.

EJD10) Skill Variety

"The extent to which various skills are needed for job performance."

- Thought to engage workers as using numerous skills in the course of work is challenging.

EJD11) Interaction (outside organisation and with beneficiaries)

"The extent to which an individual must interact and communicate with people external to the organization."

- Linked to increased job satisfaction and increased compensation requirements. Interaction with beneficiaries is linked to higher perceptions of Task Significance, and higher levels of persistence (Grant, Fried, & Juillerat, 2010).

EJD12) Interdependence

"A multi-faceted construct reflecting the extent to which workers are connected to others." Composed of Task Interdependence, Goal Interdependence, and Outcome Interdependence: Task interdependence (between jobs/roles) is "the extent to which a job requires others, and other jobs require the output of the focal job", Goal Interdependence (between teams) is "the extent to which an individual's goals overlap with another person's." Outcome Interdependence (feedback, rewards, and goals) is "the extent to which a worker's feedback and rewards are linked to another person's."

- Linked to increased satisfaction and organisational commitment, increased motivation, higher levels of overload, higher performance.

EJD13) Feedback from Others

"The extent to which members of the organization provide information about job performance." This is feedback from supervisors and co-workers as opposed to that directly from the task.

- Linked to decreased role ambiguity, increased performance, increased well-being, increased satisfaction, increased work motivation, and decreased turnover intentions.

EJD14) Social Support

"The extent to which there are opportunities for assistance and advice from supervisors and co-workers."

- Linked to increased organisational commitment, increased job satisfaction, decreased turnover intentions, decreased role ambiguity, and decreased role conflict.

EJD15) Work Conditions

"Components of the work context, including noise, health hazards, and temperature."

- Linked to decreased job satisfaction and increased stress.

EJD16) Physical Demands

"The physical activity and effort involved in a job."

- Linked to decreased job satisfaction.

EJD17) Boundary Spanning

"Interaction within an organization, but outside one's team or department."

- Linked to increased innovation, increased perceptions of role overload, decreased satisfaction, and decreased effectiveness.

EJD18) Equipment Use

"The variety and complexity of the technology and equipment used in a job."

- No demonstrated consistent impact on work outcomes.

EJD19) Ergonomics

"The extent to which work allows for correct posture and movement."

- Linked to increased job satisfaction and efficiency.

EJD20) Workload

"The amount of work to be done" (Cambridge Dictionaries Online, 2017)**.**

- Can be related to PICs such as Perceived Fairness, Autonomy, Perceived Competence, and Intrinsic Motivation.

EJD21) Organisational Support

"The nature and quality of the reward systems, information systems that warehouse and distribute relevant knowledge, the formal training system used for developing and educating workers, the availability of resources necessary for performance, and the presence of managerial support."

- Limited research but linked to increased performance and satisfaction.

EJD22) Virtuality of Work

"The degree to which individuals are collocated and/or utilize technology for mediating their communication." Team may always be active but never fully operational.

- Linked with increased role ambiguity and conflict, increased depersonalisation leading to decreased morale.

Appendix B – The Descriptive Lists of Links

This appendix contains the final descriptive lists of links. An overview of where a particular list of links can be found is indicated in Figure B-1:

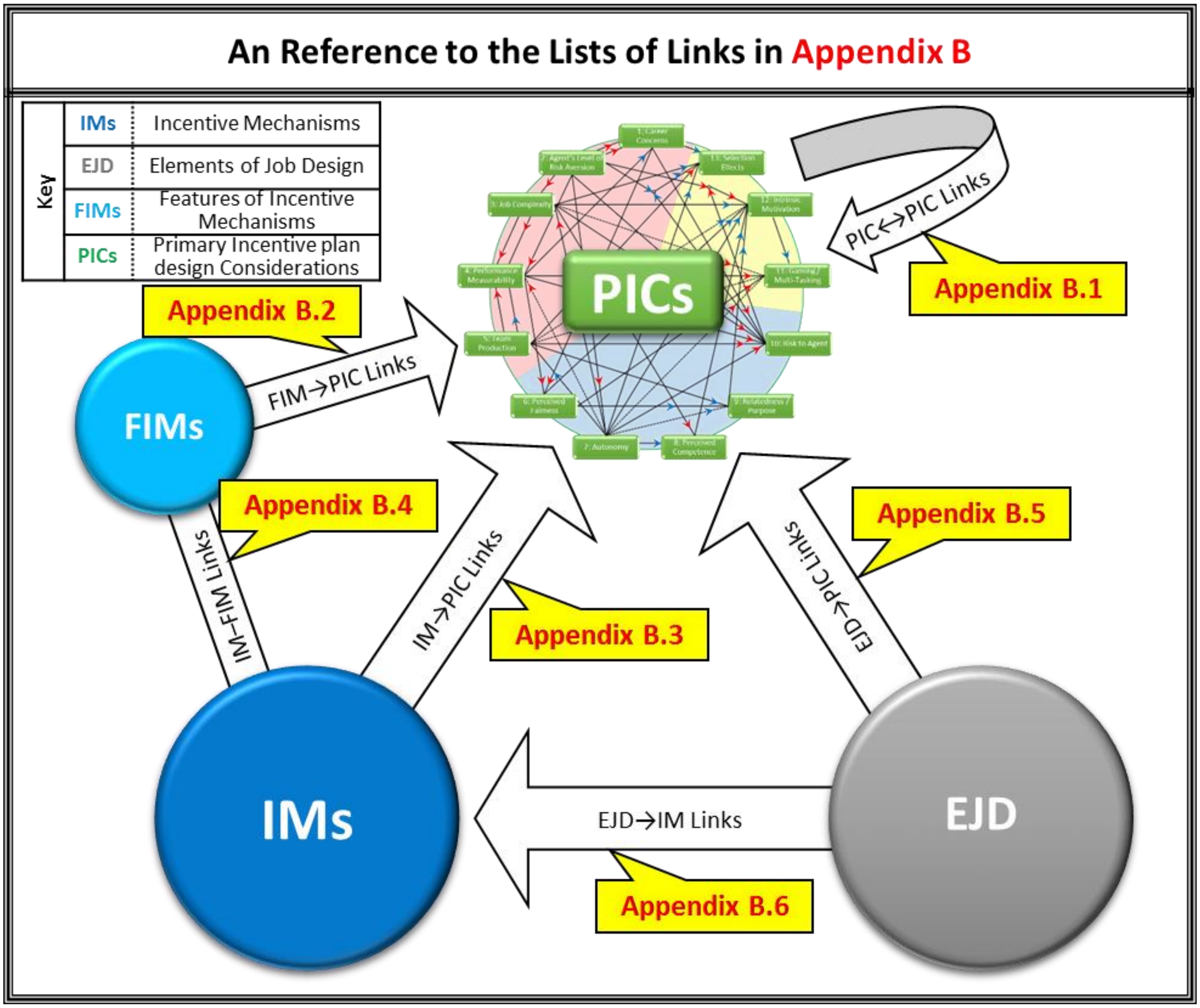


Figure B-1: A reference to the lists of links in Appendix B

Appendix B.1 – The PIC↔PIC Links (Links between PICs)

This appendix contains the 41 links between the 13 PICs as identified and discussed in Chapter 9. Figure 9-10 shows the visual representation of Link Model PIC↔PIC, the links between the PICs. It includes a designation for each link. This designation can be used to refer to the descriptive list of links in this appendix. The format of the list is as follows:

[Link number] <u>[Names of PICs that are linked]</u>
[(Link Effect)(Link Relationship)(Source Type)] **Summary of the link's effect**: Justification and explanation.

Key:

- Link Effect – The effect of the link on the PIC it points towards.
  - [P] Positively Related or Opportunities: Improving one PIC generally improves the other.
  - [N] Negatively Related or Threats: Improving one PIC is generally at the cost of the other.
- Link Relationship – The type of relationship between two PICs.
  - [R] Directly Related: The PICs are related in the sense that altering one of them generally alters the other.
  - [C] Conditionally Related: Only under certain conditions or circumstances does the link become relevant. The link is not exclusively relational but can be informative.
- Source Type – The type of source that the link was derived from.
  - [1] Key Influential Works.
  - [2] Alternative Literature.
  - [3] Inference.

PIC↔PIC1) <u>Career Concerns & Agent's Level of Risk Aversion</u>
a) [NR2] **The higher an employee's level or risk aversion the higher the cost of Career Concerns as a means of motivation becomes**: Motivating employees through Career Concerns introduces a lag time between effort exerted and reward, hence uncertainty enters the decision-making process of employees (unexpected events may occur resulting in the reward not obtained). "This problem implies that the risk attitude of employees will be an important condition for the success or failure of career enhancement" (Lambooij, Flache, & Siegers, 2009, p. 308).
b) [NC3] **A high level of risk aversion coupled with a reputation to protect, or a low level of risk aversion coupled with less reputational concerns can lead to overly cautious behaviour or unwarranted risk taking**: Situations may arise where; agents who have good reputations are unwilling to take risks that might harm their reputation, or agents who are not well known may take risks to draw attention to themselves. In both instances the behaviour might not be optimal and should be controlled for. It should always be kept in mind that "a manager is concerned about both the market's perception of his ability and the variation in such perception" (Chen & Jiang, 2006, p. 29).

PIC↔PIC2) Career Concerns & Performance Measurability

[PC1] **The higher an agent's level of visibility the more effective Career Concerns will be**: Visibility inside the firm enables the hope for Promotions while visibility outside the firm enables the hope for future private sector employment. If an agent does not perceive the agent's actions as visible Career Concerns will not be effective; Prendergast (1999, p. 53) echoes this when he discusses Career Concerns under noisy measures, they fall as "there is little updating on ability".

PIC↔PIC3) Career Concerns & Perceived Fairness

[NR3] **Promotion practices can lower Perceived Fairness**: Career Concerns often function as an implicit incentive, there is thus no contract, and performance measurement is subjective. This provides transparency challenges that can lead to issues such as perceived favouritism. Care must be taken as practices surrounding Career Concerns touch on many factors that have been identified as having a bearing on Perceived Fairness, this includes; transparency, trust, reneging, favouritism, and degree of subjectivity.

PIC↔PIC4) Career Concerns & Risk to Agent

[NR2] **Career Concerns introduces risk to the agent**: Career Concerns often use subjective, less transparent, measures and introduce a lag time between effort exerted and reward. "When an employee decides to invest extra effort to cooperate with the firms' interest, it may well be that between the moment of investment and the future reward some unexpected event occurs due to which the reward will not be obtained" (Lambooij, Flache, & Siegers, 2009, p. 308).

PIC↔PIC5) Career Concerns & Selection Effects

[PR3] **Providing for Career Concerns is likely to attract better employees**: Skilled employees with long-term aspirations are likely to be drawn to jobs where Career Concerns are provided for.

PIC↔PIC6) Agent's Level of Risk Aversion & Job Complexity

[NC3] **Agents with a high level of risk aversion are less likely to respond positively to complex jobs**: Complex jobs typically have higher skill requirements, less routine, and more uncertainties than less complex jobs. It has been observed that, "some individuals are much more likely to respond positively to an enriched, complex job than are others" (Hackman & Oldham, 1976, p. 252). This in in part due to some agents being more or less comfortable with risks and uncertainties.

PIC↔PIC7) Agent's Level of Risk Aversion & Performance Measurability

[NC1] **The more risk averse an agent is the more holistic performance measures should be**: Holmström & Milgrom (1987, p. 304) observe that optimal contracts respond to information about the agent's action provided by outcomes and reasserts that "when agents are risk averse, optimal contracts will generally depend on all available information about the agent's action."

PIC↔PIC8) Agent's Level of Risk Aversion & Autonomy

[NC3] **Providing risk averse employees with Autonomy that introduces uncertainties have costs**: While providing for Autonomy improves employees' Intrinsic Motivation the effect will be limited or even negative in situations where employees with a high level of risk aversion is exposed to too many uncertainties. Out of the four types of Autonomy identified earlier method Autonomy is expected to provide the most uncertainties.

PIC↔PIC9) Agent's Level of Risk Aversion & Risk to Agent

[NR1] **The higher an employee's levels of risk aversion the higher the costs of exposing the employee to risks**: See the definition and description of Agent's Level of Risk Aversion. It follows that all the considerations linked to Risk to Agent will be magnified according to Agent's Level of Risk Aversion.

PIC↔PIC10) Agent's Level of Risk Aversion + Risk to Agent → Intrinsic Motivation

Risk to Agent is expected to decrease Intrinsic Motivation, the decrease of Intrinsic Motivation will be higher for more risk averse employees.

- [NR1] **Risk to Agent is expected to decrease Intrinsic Motivation**: Risk inherently conduce toward an external perceived locus of causality or an external locus of control; the individual is not (or more precisely, does not perceive himself/herself to be) in control of factors that affect him/her. This leads to diminished Intrinsic Motivation: "research revealed that… diminish intrinsic motivation because… they conduce toward an external perceived locus of causality" (Ryan & Deci, 2000b, p. 70).
- [NR3] **The effects of Risk to Agent will increase as an Agent's Level of Risk Aversion increases**. Agent's Level of Risk Aversion determines how reluctant an employee is to accept risk.

PIC↔PIC11) Agent's Level of Risk Aversion + Risk to Agent → Selection Effects

Increasing the risk to employees will intensify the Selection Effects, this risk related Selection Effects will be larger for more risk averse employees.

[PR2] **Increasing the risk to employees will intensify the Selection Effects**: "The particular institutional details of incentive schemes will attract different kinds of workers and generate sorting, thereby affecting the composition of the workforce" (Boudreau & Lakhani, 2011, p. 2). This holds with risks especially.

[PR2] **Agent's Level of Risk Aversion will intensify the effect of risk related Selection Effects**: Noting that performance pay introduces uncertainties hence risk, "more risk averse individuals seem to apply for jobs where performance contingent wages are less likely" (Grund & Sliwka, 2010, p. 10).

PIC↔PIC12) Job Complexity & Performance Measurability

a) [NR1] **It is typically more difficult to measure performance in more complex jobs** (Baker, Gibbons, & Murphy, 1994). The challenge of performance measurement in complex jobs is intensified by employees having superior knowledge (Baker G. P., 1992).

b) [NC1] **Jobs with high complexity cannot rely on objective measures**: It is found, especially in more complex jobs, that the "worker's contribution to firm value is too complex and subtle to be verified by a third party and so cannot be the basis of an enforceable contract" (Baker, Gibbons, & Murphy, 1994, p. 1129).

PIC↔PIC13) Job Complexity & Autonomy

[NR1] **Job Complexity generally increases as Autonomy increases**: It has long been held that "autonomy serves, at least in part, to summarize the overall complexity of a job" (Hackman & Oldham, 1976, p. 273). Contemporary constructs that seek to measure Job Complexity, such as analysts at United States Department of Labour who developed a dictionary of occupational titles, consider Autonomy, routine, and decisions latitude (Shalley, Gilson, & Blum, 2009).

PIC↔PIC14) Job Complexity & Perceived Competence

[NC2] **An employee's Perceived Competence is at risk when the employee's ability does not match the level of Job Complexity**: People seek challenges that are in line with their abilities in order to improve and maintain their skills (Dysvik & Kuvaas, 2010; Mihaly, 2008; Ng, Lonsdale, & Hodge, 2011). An employer needs to design work that is challenging enough but not too complicated for specific employees.

PIC↔PIC15) Job Complexity & Risk to Agent

[NR2] **As Job Complexity increases Risk to Agent typically increase as well**: The more complex a job becomes the more uncertainties arise (consider the required cognitive capacity, reduction in routines, decision latitude, and Data-People-Things). Uncertainties introduce risk, especially with performance related pay where these uncertainties "may disrupt the link between effort investment and future rewards" which inherently increase the associated risk (Lambooij, Flache, & Siegers, 2009, p. 310). Note that the uncertainties are not exclusively related to measurement challenges.

PIC↔PIC16) Job Complexity & Gaming/Multitasking

[NR1] [2nd-degree link: PIC↔PIC12 and PIC↔PIC23] **The opportunities for Gaming/Multitasking increases with Job Complexity**: Two mechanisms drive this phenomena; the difficulty of measuring the performance of complex jobs, and the superior knowledge of employees.

- Measurability: "Agents can 'game' the evaluation procedure to their advantage. This arises because many jobs are complex, in the sense that many aspects of those jobs are hard to contract over. As a result, the use of explicit contracts could cause agents to focus too much on those aspects of the job included in the contract to the detriment of those that are excluded" (Prendergast, 1999, p. 21).
- Superior Knowledge: Complex jobs not only cause measurement issues but also leave agents with superior knowledge; "The reason is that the scientist is able to game the number of patents produced, using his superior knowledge to work too hard on the easy ones and not hard enough on the hard ones" (Baker G. P., 1992, p. 609).

PIC↔PIC17) Job Complexity & Intrinsic Motivation

[PC1] **Employees with high growth needs are more likely to be intrinsically motivated in complex jobs:** The phenomena observed by Hackman & Oldham (1976, p. 255) that "employees with high measured needs for growth responded more positively to complex jobs than did employees low in growth need strength" is supported and explained by contemporary authors as follows: "Individuals with high growth need strength will seek out opportunities to grow and act creatively in complex jobs even when they are not encouraged by their work context to perform creatively. In this situation, complexity can substitute for the lack of support by augmenting high growth need strength with job-related opportunities to fulfill growth desires" (Shalley, Gilson, & Blum, 2009, p. 492).

PIC↔PIC18) Job Complexity & Selection Effects

[PR3] **Job Complexity is expected to have a natural sorting effect**: Aside from higher-powered contingent incentives attracting higher-skilled workers there is evidence that workers may also sort "on the basis of their intrinsic preferences for one regime or another – that is, their intrinsic 'fit' with available institutions" (Boudreau & Lakhani, 2011, p. 2).

PIC↔PIC19) Performance Measurability & Team Production

a) [PC1] **Team Production s setting allow mutual monitoring**: A common economic argument for team-based incentives is that these policies encourage mutual monitoring (Baker, Jensen, & Murphy, 1988; Prendergast, 1999).

b) [NC1] **Team Production settings make it more difficult to measure individual performance**: "Team production problems potentially arise in situations where individual contributions to output cannot be easily identified and compensation must be based on team production" (Prendergast, 1999, p. 39).

PIC↔PIC20) Performance Measurability & Perceived Fairness

[NC3] **When subjective measures are used Perceived Fairness can be negatively affected**: "The essential feature of subjective assessments is that they cannot be verified by outsiders" (Prendergast, 1999, p. 29). Relying solely on subjective measures can thus hamper levels of Perceived Fairness.

PIC↔PIC21) Performance Measurability & Autonomy

[NR2] **As Autonomy increases Performance Measurability becomes more difficult**: "In organisations with a high ambiguity and a low routine, measurement of output is more difficult" (Dooren, 2005, p. 372).

PIC↔PIC22) Performance Measurability & Risk to Agent

[NR3] **Challenges with performance measures can increases the risk to employees**: Uncertainties with performance measures or a heavy reliance on subjective measures can impose risk on employees. Uncertainties introduce risk, especially with performance related pay where these uncertainties "may disrupt the link between effort investment and future rewards" which inherently increase the associated risk (Lambooij, Flache, & Siegers, 2009, p. 310). Subjective measures impose a risk on employee as firm may renege on rewards or underrate performance (this is closely related to trust under Perceived Fairness). Conversely the same can be true for explicit measures "since explicit measures are affected by factors outside the employee's control, they impose risk on the employee" (Gibbs, Merchant, Van Der Stede, & Vargus, 2009, p. 237).

PIC↔PIC23) Performance Measurability & Gaming/Multitasking

[NR1] **As it becomes more difficult to holistically and accurately measure performance the opportunities for gaming increases**: Gaming or multitasking occurs "because contracts often cannot rely upon a holistic measure of the worker's contribution at every moment in time" allowing employees to "game the compensation system" (Prendergast, 1999, p. 8). Using subjective, as opposed to objective, measure does not completely solve this problem as employee can still manipulate the 'measurements' by currying favour instead of optimising performance (Prendergast, 1999). In such situations employees can "pursue advancement through image management, social relationships, and personal manipulation rather than by means of effective performance" (Orpen, 1998, p. 128).

PIC↔PIC24) Team Production & Autonomy

[PC2] **In settings with high levels of Task Interdependence Autonomy can create opportunities for Team Production**: "When task interdependence is high there will be a strong need for team members to help one another and to mutually adjust efforts but, if at the same time the level of perceived task autonomy is low, there will be few opportunities to do so" (Molleman, 2009, p. 248).

PIC↔PIC25) Team Production & Relatedness/Purpose

[PR3] **Team Production settings, especially with a high degree of Task Interdependence, typically enhances relatedness**: Employees who do not interact regularly with other employees are less likely to from bonds that facilitates a sense of belonging or relatedness. Team Production settings, especially where a high degree of Task Interdependence exists, is expected to increase the incidence of employees who experience a sense of belonging or relatedness.

PIC↔PIC26) Team Production & Risk to Agent

[NR2] **Team Production settings impose additional risk on employees**: In Team Production settings measures of an employee's success depends not only on the actions of the employee but on that of the employee's team members as well. External factors outside the employee's control thus have a bearing on the employee's success, and it is accepted that "factors outside the employee's control, they impose risk on the employee" (Gibbs, Merchant, Van Der Stede, & Vargus, 2009, p. 237).

PIC↔PIC27) Team Production & Gaming/Multitasking

[NR1] [2nd-degree link: PIC↔PIC19 and PIC↔PIC23] **Team Production settings increases the opportunities for Gaming/Multitasking**: Performance measurement for individuals especially become more difficult in team settings, it follows that "there is considerable evidence of free riding in teams" (Prendergast, 1999, p. 9). Free riding or social loafing is a reduction in motivation and effort when individuals work collectively and receives much attention in the literature (Karau & Williams, 1995; Garbers & Konradt, 2014; Barnes, Hollenbeck, Jundt, DeRue, & Harmon, 2010).

PIC↔PIC28) Team Production & Intrinsic Motivating

[PR1] [2nd-degree link: PIC↔PIC25 and PIC↔PIC40] **Team Production settings are expected to have a positive effect on internal motivation**: Noting the link between Team Production and Relatedness/Purpose and the link between the latter and Intrinsic Motivation is flows that Team Production will typically have a positive influence on Intrinsic Motivation. This is noted by Hackman & Oldham (1976, p. 277): "people ... experience greater internal motivation when they are satisfied with on-the-job relationships than when they are dissatisfied with these relationships."

PIC↔PIC29) Team Production & Selection Effects

[NR2] **Team Production can lead to adverse Selection Effects**: "Low-ability workers could expect that teaming up with higher-ability workers would raise their pay. However, since high-ability workers would think the opposite way, this creates an adverse selection problem" (Hamilton, Nickerson, & Owan, 2003, p. 467).

PIC↔PIC30) Perceived Fairness & Relatedness/Purpose

[PR2] **Perceived Fairness improves employees' sense of relatedness**: An employee's sense of relatedness or belonging, especially with regard to the organisation, is improved if the employee has a perception of being treated fairly. "Employees come to understand their relationship to organizations and organizational authorities in terms of social exchange when they experience procedural fairness in their treatment, because this communicates to them that they are valued and cared for" (Kamdar, McAllister, & Turban, 2006, p. 843).

PIC↔PIC31) Perceived Fairness & Gaming/Multitasking

[NC1] **When transparency is used to improve Perceived Fairness opportunities for gaming typically increase**: Transparency affects an agent's perception of fairness (Gagne & Deci, 2005, p. 354) yet high levels of transparency, especially in situation where the agent has superior information, often leads to dysfunctional behavioural responses. It is suggested that limiting transparency can help deter gaming, this reasoning is extensive dating back to at least Bentham in 1830 (Ederer, Holden, & Meyer, 2013). As a result there is a trade-off between being transparent and withholding some information (Jehiel, 2015).

PIC↔PIC32) Perceived Fairness & Intrinsic Motivation

[PR2] **Intrinsic Motivation should improve with Perceived Fairness**: There is a strong link between citizenship behaviours and Intrinsic Motivation: "In sum, we have a generous fund of empirical support for the importance of Perceived Fairness in determining the full extent of cooperative contributions to organizations, particularly those contributions comprising what we have come to call citizenship behaviors" (Organ & Moorman, 1993, p. 16).

PIC↔PIC33) Autonomy & Perceived Competence

[PR1] **Increased Autonomy is expected to result in increased Perceived Competence**: Not feeling 'controlled' is expected to increase an employee's perception of the employee's own levels of competence. There is wide support for the hypothesis that "increases in Perceived Competence must be accompanied by a sense of autonomy in order for the enhanced feelings of competence to result in increased intrinsic motivation" (Ryan & Deci, 2000a, p. 59).

PIC↔PIC34) Autonomy & Relatedness/Purpose

[PC3] [2nd-degree link: PIC↔PIC24 and PIC↔PIC25] **Increased levels of Autonomy, when coupled with Task Interdependence, is expected to support Relatedness/Purpose**: Employees who have more Autonomy, especially when coupled with a high degree of Task Interdependence, have more opportunities to interact with colleagues and develop a sense of belonging or relatedness.

PIC↔PIC35) Autonomy & Risk to Agent

[NR3] [2nd-degree link: PIC↔PIC21 and PIC↔PIC22 + PIC↔PIC13 and PIC↔PIC15] **Increased levels of Autonomy exposes employees to more risks**: Autonomy provides freedom in areas such as procedures/methods, scheduling/sequencing/timing, criteria, and even team selection. This introduces certain uncertainties. Uncertainties introduce risk, especially with performance related pay where these uncertainties "may disrupt the link between effort investment and future rewards" which inherently increase the associated risk (Lambooij, Flache, & Siegers, 2009, p. 310). Note that the uncertainties are not exclusively related to measurement challenges.

PIC↔PIC36) Autonomy & Gaming/Multitasking

[NR2] [2nd-degree link: PIC↔PIC21 and PIC↔PIC23] **Increasing Autonomy increases the scope for Gaming/Multitasking**: As Autonomy increases the following situation is approached; "In organisations with a high ambiguity and a low routine, measurement of output is more difficult" (Dooren, 2005, p. 372). As measurability declines the scope for Gaming/Multitasking increases. This has led to the observation; "Whether workers make effective use of Autonomy may depend on individual motivational states" (Heidemeier & Wiese, 2014, p. 18).

PIC↔PIC37) Autonomy & Intrinsic Motivation

[PR1] **Increasing Autonomy increases Intrinsic Motivation**: Work from behavioural scientists are adamant that there is a strong link between Autonomy and Intrinsic Motivation (Gagne & Deci, 2005; Ryan & Deci, 2000b).

PIC↔PIC38) Autonomy & Selection Effects
[PR3] **Autonomy is expected to have a natural sorting effect**: Aside from higher-powered contingent incentives attracting higher-skilled workers there is evidence that workers may also sort "on the basis of their intrinsic preferences for one regime or another – that is, their intrinsic 'fit' with available institutions" (Boudreau & Lakhani, 2011, p. 2). It follows that some individuals will seek employment where a certain level of Autonomy is provided.

PIC↔PIC39) Perceived Competence & Intrinsic Motivation
[PR1] **Perceived Competence increases Intrinsic Motivation**: Work from behavioural scientists are adamant that there is a strong link between Perceived Competence and Intrinsic Motivation (Gagne & Deci, 2005; Ryan & Deci, 2000b). "Where rewards are positively informational, they are predicted to provide satisfaction of the need for competence and thus to enhance intrinsic motivation" (Deci, Koestner, & Ryan, 1999, p. 628).

PIC↔PIC40) Relatedness/Purpose & Intrinsic Motivation
[PR1] **Relatedness/Purpose increases Intrinsic Motivation**: Relatedness/Purpose is one of the key drivers of Intrinsic Motivation (Latham & Pinder, 2005; Pink, 2009; Ryan & Deci, 2000b).

PIC↔PIC41) Gaming/Multitasking & Intrinsic Motivation
[PR1] **Intrinsic Motivation is expected to decrease the incidence of Gaming/Multitasking**: Issues such as detachment and disengagement could at least be partially remedied through higher levels of Intrinsic Motivation (Deci, Koestner, & Ryan, 1999).

Appendix B.2 – The FIM→PIC Links (Links between PIC and FIMs)

This appendix contains the 23 links between the 13 PICs and the Features of Incentive Mechanisms (FIMs) as identified and discussed in Chapter 10. Figure 10-5 shows the visual representation of Link Model FIM→PIC, the links between the PICs and the FIMs. It includes a designation for each link. This designation can be used to refer to the descriptive list of links in this appendix. The format of the list is as follows:

[Link number)] [Name of FIM & PIC that is linked]
[Link Effect] **[Summary of the link's effect**: Additional Information.]

Key:

- Link Effect - The FIMs and PICs do not all affect each other in the same manner. The relationships are:
  - [P] Positive – Common opportunities or positive effects in relation to the liked PIC.
  - [N] Negative – Common dangers, threats, or negative effects in related to the linked PIC.
  - [I] Informative – A situation where FIMs are typically used in a certain manner.
  - [G] Governing – Certain, often opposing, effects that occur to a certain degree depending on how much emphasis is placed on each option in a specific FIM. These effects can be a combination of; positive effects, negative effects, and certain threats or opportunities.

FIM→PIC1) Performance Measures (FIM1) & Performance Measurability (PIC4)
[I] **Good Performance Measurability allows the use of objective performance measures while poor Performance Measurability suggests the use of subjective performance measures:** Objective measures are dependent on the availability and comprehensiveness of quantitative indicators. In the absence of comprehensive quantitative indicators subjective measures can be used. As an example "complex jobs [as per link PIC↔PIC12] will typically not be evaluated through explicit contracts" (Prendergast, 1999, p. 9).

FIM→PIC2) Performance Measures (FIM1) & Perceived Fairness (PIC6)
[G] **Using more objective performance measures typically improves Perceived Fairness:** Two of the factors affecting Perceived Fairness is transparency (Gagne & Deci, 2005, p. 354) and trust (Baker, Gibbons, & Murphy, 1994, p. 1127). "While an explicit contract can be enforced by a court, an implicit contract cannot, and so is vulnerable to reneging by the firm" (Baker, Gibbons, & Murphy, 1994, p. 1127). This is a concern as "Subjective performance evaluation procedures are subject to systematic cognitive biases in evaluation and might be considered as procedurally unfair as they cannot provide consistency and objectivity in the same way as objective evaluations do" (Weibel, Rost, & Osterloh, 2009, p. 405). As "there is a danger of the firm underreporting performance in order to save wages" (Prendergast, 1999, p. 37) Perceived Fairness concerns arise with subjective measures. As objective measures can be verified there is little subjectivity, trust issues are thus minimised and high levels of transparency can be facilitated.

FIM→PIC3) <u>Performance Measures (FIM1) & Risk to Agent (PIC10)</u>

[G/N] **Objective measures impose common risks on employees while subjective measures impose trust related risks on employees:** Objective measures struggle to account for common risks. "Government policies, economic climate, competitor actions, technological change, and so on, may cause uncontrollable variations in outcomes" (Eisenhardt, 1989, p. 61). "Since explicit measures are affected by factors outside the employee's control, they impose risk on the employee" (Gibbs, Merchant, Van Der Stede, & Vargus, 2009, p. 237). When subjective measures are considered "The disadvantage is that the parties can renege" (Gibbons, 1998, p. 121) as they are not easily enforceable by a court. Subjective measures hence impose a risk on employees as the firm may renege on rewards or underrate performance (this is closely related to trust under Perceived Fairness).

FIM→PIC4) <u>Performance Measures (FIM1) & Gaming/Multitasking (PIC11)</u>

[G] **The more subjective performance measures are the less susceptible they are to gaming:** "Subjective assessments have the benefit that they can be a more fully rounded measure of performance" (Prendergast, 1999, p. 9) making IMs that use them harder to game. When objective performance measures are used there is a danger of "resourceful employees 'gaming the system' by optimizing with respect to actual instead of intended measures" (Baker, Jensen, & Murphy, 1988, p. 597) or of employees focusing "too much on those aspects of the job included in the contract to the detriment of those that are excluded" (Prendergast, 1999, p. 21). Note that this effect is regulated by link FIM→PIC1 and that subjective measures are not immune to gaming. Specific issues that should be accounted for include:

- Subjective performance measures:
    - Currying Favour: Using subjective, as opposed to objective, measures does not completely solve the Gaming/Multitasking problem as employees can still manipulate the 'measurements' by currying favour instead of optimising performance (Prendergast, 1999).
- Objective performance measures (Ederer, Holden, & Meyer, 2013, p. 1):
    - Effort Diversion: "Diversion of effort away from activities that are socially valuable but difficult to measure and reward, towards activities that are easily measured and rewarded."
    - Exploitation of Classification Rules: "Exploitation of the rules of classification to improve apparent, though not actual, performance."
    - Timing Distortions: "Distortion of choices about timing and/or pricing to exploit temporarily high monetary rewards even when socially efficient choices have not changed."

FIM→PIC5) Performance Requirements (FIM2) & Gaming/Multitasking (PIC11)

[G] **Opportunities for Gaming/Multitasking typically decrease as the linearity of an incentive plan's performance measures increase:** Linear schemes "are often used in practice for their simplicity and relative robustness against manipulation" (Dixit, 2002, p. 698). Conversely the step function nature of non-linear schemes allow them to be gamed in various ways; "Lump-sum bonuses tempt salespeople to manipulate the timing of orders to meet sales quotas without having to expend additional effort" and "Salespeople who have already made quota are encouraged to push out new orders to the next period to make attaining future quotas easier to accomplish, a behavior termed delayed selling" (Steenburgh, 2008, p. 236). Some typical examples of dysfunctional responses include:

- Waiting until the last minute for discounting reasons.
- Slacking after reaching the target or if reaching it becomes improbable.
- Manipulating the timing of events to fall in the current or next period.

FIM→PIC6) Performance Requirements (FIM2) & Perceived Fairness (PIC6)

[G] **The level of Perceived Fairness typically increases as the linearity of an incentive plan's performance measures increase:** One of the advantages of linear schemes is their simplicity (Dixit, 2002). This allows a high level of transparency which "affects an agent's perception of fairness" (Gagne & Deci, 2005, p. 354). Conversely non-linear incentive plans tend to become more complicated and can lead to lower levels of perceived transparency and introduce trust issues. Employee who just miss a quota for example may experience not receiving a reward as unfair.

FIM→PIC7) Performance Requirements (FIM2) & Risk to Agent (PIC10)

[G] **The level of Risk to Agent typically increases as the linearity of an incentive plan's performance measures decreases:** The step function nature of non-linear incentive plans puts the agent at risk of not receiving a reward for effort exerted. Linear incentive plans do not expose agents to the same level of risk in this regard.

FIM→PIC8) Performance Requirements (FIM2) & Performance Measurability (PIC4)

[I] **Linear schemes, especially Piece Rates, work best in simple jobs:** Piece Rates work best in situations where "workers carry out simple jobs, in the sense that aggregate measures of performance are available" (Prendergast, 1999, p. 17).

FIM→PIC9) Performance Requirements (FIM2) & Perceived Competence (PIC8)

[N] **Performance requirements can harm Perceived Competence through competency signals:** Performance requirements such as quotas, milestones, and thresholds must be designed with competency signals in mind; performance-based incentives serve as competency feedback. If these performance requirements are not well designed they will either not stimulate improved levels of performance, or be difficult to achieve. If they are unreasonable, employees will seldom achieve them and experience a negative competency signal. Sending Positive Feedback can lift an employee's level of Perceived Competence (Aparicio, Vela, Sanchez, & Montes, 2012; Eisenberger & Rhoades, 1999) and vice versa.

FIM→PIC10) Performance Requirements - Tournaments (FIM2.1) & Performance Measurability (PIC4)

[I] **Tournaments are typically used when it is easier to measure relative than absolute performance:** Tournaments may be the socially efficient arrangement if rank is easier to observe than is individual performance (Lazear & Rosen, 1981, p. 861).

FIM→PIC11) Performance Requirements - Tournaments (FIM2.1) + Team Production (PIC5) → Gaming/Multitasking (PIC11)

[N+] **Tournaments can lead to employees not helping their competitors, this results in difficulties in Team Production scenarios:** "A problem with tournaments is that since individuals are evaluated on how well they do relative to others, they are unlikely to help their competitors in need" (Prendergast, 1999, p. 35).

FIM→PIC12) Performance Requirements - Tournaments (FIM2.1) → Agent's Level of Risk Aversion (PIC2)

[I] **Less risk averse employees are more likely to prefer tournaments (or Piece Rates):** "The likelihood that subjects prefer the piece rate or the tournament is higher the less risk averse they are" (Dohmen & Falk, 2011, p. 557). This is due to the high level of risk associated with tournament and Piece Rates.

FIM→PIC13) Performance Requirements - Tournaments (FIM2.1) → Selection Effects (PIC13)

[P] **Tournaments and other variable pay schemes typically attract productive workers:** "Productive workers are more likely to self-select into variable-payment schemes", "the effect is strongest in the most competitive scheme, the tournament" (Dohmen & Falk, 2011, p. 583).

FIM→PIC14) Performance Requirements - Tournaments (FIM2.1) → Perceived Fairness (PIC6)

[N] **Competitive incentives may have a negative effect on Perceived Fairness:** "People may perceive competitive incentives as less fair than piece-rate or quota plans" (Stolovich, 2010, p. 4).

FIM→PIC15) Reward Type (FIM3) → Autonomy (PIC7)

[P] **Employees can be granted more Autonomy as an intangible reward:** The extrinsic reward IM6 (Autonomy as an Incentive Mechanism) naturally results in increased levels of Autonomy.

FIM→PIC16) Reward Type (FIM3) → Perceived Competence (PIC8)

[P] **Recognition can be used as an intangible reward to increase Perceived Competence:** The extrinsic reward IM5.1 (Positive Feedback) typically results in increased levels of Perceived Competence.

FIM→PIC17) Reward Type (FIM3) → Intrinsic Motivation (PIC12)

[G] **Extrinsic rewards, especially tangible rewards, can decrease Intrinsic Motivation:** It is to be acknowledged that there is evidence that strong monetary rewards (extrinsic, typically tangible) can have a crowding-out effect on Intrinsic Motivation (Deci, Koestner, & Ryan, 1999; Gagne & Deci, 2005). This phenomenon, with its roots in behavioural science or psychology, is complex but centres around the idea that extrinsic motivators can be so powerful that they crowd out the drivers for Intrinsic Motivation. Determining thresholds is not possible, yet being aware of this should help users to gain a somewhat better understanding of the multifaceted challenge of human motivation.

FIM→PIC18) Reward Type (FIM3) → Career Concerns (PIC1)

[I] **An employee's Career Concerns determines what type of reward the employee values:** Ambitious or young employees are more likely to be concerned about the effects of current performance on future compensation; they are likely to "exert effort not just to maximize current pay but also to affect the perceptions of others" (Prendergast, 1999, p. 51). It follows that Incentive Mechanisms like the opportunity for Promotion, Recognition and visibility, and reputation concerns would be specifically valued.

FIM→PIC19) Reward Type (FIM3) → Selection Effects (PIC13)

[P] **The type of reward can have positive Selection Effects:** Factors like Career Concerns, Agent's Level of Risk Aversion, and individuals' desired job characteristics can prompt individuals to self-select into specific jobs. The type of reward can thus have Selection Effects, some examples are: Individuals who value Autonomy will be attracted by incentive plans that reward performance with higher levels of Autonomy; as per link FIM→PIC18 rewards that that provide opportunities for Promotion, Recognition, and visibility will be more attractive to individuals with certain Career Concerns; and individuals who are more focused on Intrinsic Motivation might be more attracted by intangible rewards.

FIM→PIC20) Target Audience (FIM4) → Gaming/Multitasking (PIC11)

a) [G] **Moving from individual to team based incentives increases the danger of the free-rider problem:** Team based systems are susceptible to the free-rider or 1/n problem (Baker, Jensen, & Murphy, 1988; FitzRoy & Kraft, 1995; Prendergast, 1999). Free riding or social loafing is a reduction in motivation and effort when individuals work collectively and receives much attention in the literature (Karau & Williams, 1995; Garbers & Konradt, 2014; Barnes, Hollenbeck, Jundt, DeRue, & Harmon, 2010)

b) [G] **Moving from individual to team based incentives tends to flatten productivity:** Moving to team based systems "Improves the performance of those who were less productive on individual schemes but decreases that of the more productive" (Prendergast, 1999, p. 41).

c) [G] **Moving from team based to individual incentives has a negative effect on cooperation:** Team based systems stimulates cooperation (FitzRoy & Kraft, 1995; Holmström & Milgrom, 1991; Prendergast, 1999).

FIM→PIC21) Target Audience (FIM4) → Performance Measurability (PIC4)

[I] **In situations where individual performance is hard to measure team members can monitor one another:** With team based systems employees have an incentive to monitor each other and exert positive peer pressure (Baker, Jensen, & Murphy, 1988; FitzRoy & Kraft, 1995; Prendergast, 1999). This is especially useful in situations where individual contributions to output cannot be easily identified (Prendergast, 1999) while team based performance measures are more accurate (Breaugh J. A., 1999).

FIM→PIC22) Target Audience (FIM4) → Selection Effects (PIC13)

[G] **Moving from team based to individual incentives typically attracts higher performing employees:** Incentive pay affects the supply of workers, namely when workers or managers are offered incentive pay, they self-select into jobs where they expect their compensation to be higher (Bandiera, Barankay, & Rasul, 2007). "This means that group-based pay may also have unfavorable sorting effects, causing the highest performers to choose alternative opportunities where individual results will be rewarded more heavily" (Rynes, Gerhart, & Parks, 2005, p. 585).

FIM→PIC23) Target Audience (FIM4) → Team Production (PIC5)

[I] **The balance between individual and group incentives should be aligned with Team Production considerations:** Incentive plans should enhance situations where "Individuals will perform actions for their team that they would be unwilling to perform strictly for themselves" (Babcock, Bedard, Charnes, Hartman, & Royer, 2011, p. 26) and be sensitive to areas where individual incentives may cause employees to be "unlikely to help their competitors in need" (Prendergast, 1999, p. 35).

Appendix B.3 – The IM→PIC Links (Links between PICs and IMs)

This appendix contains the 59 links between the 13 PICs and the Incentive Mechanisms (IMs) as identified and discussed in Chapter 10. Figure 10-7 through Figure 10-13 shows the visual representation of Link Model IM→PIC, the links between the PICs and the IMs. It includes a designation for each link. This designation can be used to refer to the descriptive list of links in this appendix. The format of the list is as follows:

[Link number)] [Name of IM & PIC that is linked]
[Link Effect, Link Type] **[Summary of the link's effect**: Additional Information.]

Key:

- Link Effect – The IMs and PICs do not all affect each other in the same manner. The relationships are:
  - Positive (P) – The use of this IM typically has a positive effect on the linked PIC.
  - Negative (N) – The use of this IM typically has a negative effect on the linked PIC.
  - Informative (I) – A situation where an IM is typically used in a certain manner.
- Link Type – Some links are specific to a certain IM, while other links are worth noting yet generic:
  - Characteristic link (C) – A link between an IM and PIC that characteristically has a certain effect. This is usually specific to the IM.
  - Generic link (G) – A link between an IM and PIC, informed by the links between IMs-FIMs-PICs, due to the configuration of a specific FIM as per the governing FIM→PIC Links.

IM→PIC1) Piece Rates/Commission (IM1) & Performance Measurability (PIC4)
[IC] **Piece Rates typically work well for 'simple' jobs where individual performance is easy to measure:** Due to Piece Rates typically awarding individuals 'per unit produced' it is noted that where "workers carry out 'simple' jobs, in the sense that aggregate measures of performance are available; it is for these jobs that Piece Rates are most likely to work" (Prendergast, 1999, p. 17). This corresponds with link FIM→PIC1 and FIM→PIC8.

IM→PIC2) Piece Rates/Commission (IM1) & Team Production (PIC5)
[IC] **Piece Rates do not work well in a team setting:** Due to the focus on individual performance it is not surprising that Piece Rates "do not fit well with the team approach" (Noe, Hollenbeck, Gerhart, & Wright, 2006, p. 510). This is in line with link FIM→PIC23.

IM→PIC3) Piece Rates/Commission (IM1) & Perceived Fairness (PIC6)
[PG] **Piece Rates generically have a positive effect on Perceived Fairness:** Piece Rates make use of objective performance measures with linear performance requirements, this generically has a positive effect on Perceived Fairness as per link FIM→PIC2 and FIM→PIC6.

IM→PIC4) Piece Rates/Commission (IM1) & Risk to Agent (PIC10)

a) [NC] **Piece Rates expose employees to a certain degree of risk:** Since the employee's remuneration is not fixed, but performance dependent, a certain degree of risk is introduced. Care should be taken to ensure that factors outside the employee's control that affect the employee's performance measures are limited. Refer to link FIM→PIC3.

b) [PG] **Piece Rates use linear performance measures which has favourable risk characteristics:** See link FIM→PIC7.

IM→PIC5) Piece Rates/Commission (IM1) & Gaming/Multitasking (PIC11)

a) [NC] **Piece Rates can cause effort diversion:** Due to the nature of Piece Rates, performance related pay focused on individuals, it can lead to employees doing "whatever they get paid for and nothing else" (Noe, Hollenbeck, Gerhart, & Wright, 2006, p. 510). It follows that "piece rates may lead agents to abuse shared equipment or to take inadequate care of it" (Holmström & Milgrom, 1991, p. 25) or a range of related dysfunctional responses depending on the setting. See link FIM→PIC4.

b) [NG] **Piece Rates use individual incentives which has a negative effect on cooperation:** See link FIM→PIC20c.

c) [PG] **Piece Rates use linear performance measures which makes gaming more difficult:** See link FIM→PIC5.

d) [PG] **Piece Rates uses individual incentives and does not suffer from the free-rider problem:** See link FIM→PIC20a.

IM→PIC6) Piece Rates/Commission (IM1) & Intrinsic Motivation (PIC12)

[NG] **Piece Rates typically use tangible rewards as extrinsic motivators which can have a negative effect on Intrinsic Motivation:** Refer to link FIM→PIC17.

IM→PIC7) Piece Rates/Commission (IM1) & Selection Effects (PIC13)

[PC] **Piece Rates tend to attract more-able employees:** "More able workers, who shunned the firm under hourly wages, are attracted by piece rates" (Lazear E. P., 2000, p. 1359). This effect is not limited to Piece Rates but extends to incentive plans that award individual performance in general. This selection effect is widely recognised and emphasised; Prendergast (1999, p. 14) echoes it, "compensation contracts have Selection Effects, with higher Piece Rates being relatively more attractive to better workers. This is in line with expectations according to link FIM→PIC13 and FIM→PIC22.

IM→PIC8) Performance Bonuses (IM2) & Intrinsic Motivation (PIC12)

[NG] **Performance Bonuses typically use tangible rewards as extrinsic motivators which can have a negative effect on Intrinsic Motivation:** Refer to link FIM→PIC17.

IM→PIC9) Performance Bonuses; Gainsharing (IM2.1) & Performance Measurability (PIC4)

[IC] **Gainsharing is only suitable when the team or group's performance is easy to measure:** Gainsharing rewards the performance of a group, as opposed to an individual or the organisation as a whole, it can thus only be used where suitable measures of the group's performance are available.

IM→PIC10) Performance Bonuses; Gainsharing (IM2.1) & Team Production (PIC5)

[IC] **Gainsharing is well suited to a Team Production setting:** In team settings where outcomes are derived from the joint contributions of many individuals Gainsharing works well; factors such as Task Interdependence and internal/mutual monitoring is supported by rewarding group performance in such settings.

IM→PIC11) Performance Bonuses; Gainsharing (IM2.1) & Relatedness/Purpose (PIC9)

[PC] **Gainsharing can stimulate an employee's sense of Relatedness/Purpose:** In Team Production settings Gainsharing encourages teamwork, it has been noted that "individuals will perform actions for their team that they would be unwilling to perform strictly for themselves" (Babcock, Bedard, Charnes, Hartman, & Royer, 2011, p. 26). It follows that placing more emphasis on teamwork stimulates factors that are conducive to employees feeling a sense of relatedness towards one another, recall that relatedness refers to "feeling connected to others, to caring for and being cared for by those others, to having a sense of belongingness both with other individuals and with one's community" (Ryan & Deci, 2002, p. 7).

IM→PIC12) Performance Bonuses; Gainsharing and Profit-sharing (IM2.1+IM2.2) & Perceived Fairness (PIC6)

[PG] **Gainsharing and Profit-sharing uses objective performance measures which typically improves Perceived Fairness:** See link FIM→PIC2.

IM→PIC13) Performance Bonuses; Gainsharing and Profit-sharing (IM2.1+IM2.2) & Risk to Agent (PIC10)

[NG] **Gainsharing and Profit-sharing uses objective performance measures which exposes employees to certain risks:** See link FIM→PIC3.

IM→PIC14) Performance Bonuses; Gainsharing and Profit-sharing (IM2.1+IM2.2) & Gaming/Multitasking (PIC11)

a) [NG] **Gainsharing and Profit-sharing uses objective performance measures which are typically more susceptible to gaming:** See link FIM→PIC4. Note that, specifically with Profit-sharing, the measures tend to be hard to game for low level employees.

b) [NG] **Gainsharing and Profit-sharing is subject to social loafing:** Profit-sharing to a greater degree than Gainsharing, introduces social loafing or the 1/N problem; a reduction in motivation and effort when individuals work collectively as each employee receives only a portion of the gains from exerting more effort. Refer to link FIM→PIC20a.

c) [PG] **Gainsharing and Profit-sharing uses group-based incentive plans and has a positive effect on cooperation:** Refer to link FIM→PIC20c.

IM→PIC15) Performance Bonuses; Gainsharing and Profit-sharing (IM2.1+IM2.2) & Selection Effects (PIC13)

[NG] **Gainsharing and Profit-sharing uses group-based incentive plans which are not specifically attractive to higher performing employees:** Refer to link FIM→PIC22.

IM→PIC16) Employee Ownership (IM3) & Performance Measurability (PIC4)

[IC] **Employee Ownership plans are typically found when information asymmetries are great and no good performance measures exist:** "Incentive contracts based on the total value of the organization, such as partnerships and stock ownership, will dominate when information asymmetries are great and no good performance measures exist" (Baker G. P., 1992, p. 612).

IM→PIC17) Employee Ownership (IM3) & Perceived Fairness (PIC6)

[PG] **Employee Ownership plans generally have a positive effect on Perceived Fairness:** Employee Ownership plans typically use objective performance measures with linear performance requirements; this usually has a positive effect on Perceived Fairness as per link FIM→PIC2 and FIM→PIC6. The positive effect is affected by the simplicity and transparency of the plan.

IM→PIC18) Employee Ownership (IM3) & Risk to Agent (PIC10)

a) [NG] **Employee Ownership plans typically use objective performance measures which exposes employees to certain risks:** See link FIM→PIC3.

b) [PG] **Employee Ownership plans typically use linear performance measures which has favourable risk characteristics:** See link FIM→PIC7.

IM→PIC19) Employee Ownership (IM3) & Gaming/Multitasking (PIC11)

a) [PC] **Employee Ownership plans can mitigate multitasking problems:** Ownership, especially by managers, aligns the managers' interests with those of the owners (Eisenhardt, 1989); high ownership causes agents to think more like the principal (Chen & Jiang, 2006). It follows that "ownership can solve some multitasking problems" (Prendergast, 1999, p. 23).

b) [NC] **Employee Ownership plans, especially for non-managerial staff, are subject to the free-rider problem:** "The link between pay and performance" is low, and "less motivational the larger the organization". Lower level employees who "may see much less opportunity to influence overall organization performance" are less motivated by ownership (Noe, Hollenbeck, Gerhart, & Wright, 2006, p. 514). This is due to social loafing or the 1/N problem; a reduction in motivation and effort when individuals work collectively as each employee receives only a portion of the gains from exerting more effort. See link FIM→PIC20.

c) [NG] **Employee Ownership plans use objective performance measures which are typically more susceptible to gaming:** See link FIM→PIC4. Note that the measures tend to be hard to game for low level employees.

d) [PG] **Employee Ownership plans typically use linear performance measures which makes gaming more difficult:** See link FIM→PIC5.

IM→PIC20) Employee Ownership; Stock Options (IM3.1) & Risk to Agent (PIC10)

[PC] **Stock Options typically pose no downside risk to employees:** Stock option typically give employees the option of buying stock at a later stage. If the stock grows employee end up being linearly rewarded for the growth; if the stock's value decreases employees refrain from buying the stock and suffer no losses. Stock Options thus impose little risk on employees aside from the generic risks as noted in link IM→PIC18 and FIM→PIC3.

IM→PIC21) <u>Employee Ownership; Stock Options (IM3.1) & Gaming/Multitasking (PIC11)</u>
[NC] **As Stock Options hold no downside risk they have no motivational effect in a down market:** As a result of Stock Options awarding growth but being redundant when the value of stock falls it is accepted that they are valueless in a down market (CIPD, 2015).

IM→PIC22) <u>Employee Ownership; ESOPs (IM3.2) & Gaming/Multitasking (PIC11)</u>
[NC] **ESOPs expose employees to downside risks influenced by factors outside of the employees' control:** One of the motivational advantages of ESOPs is that it gives employee skin in the game or a piece of the action (Noe, Hollenbeck, Gerhart, & Wright, 2006). This however exposes employees to a downside risk in a situation where the outcomes are influenced by factors that are outside their control as per link FIM→PIC3.

IM→PIC23) <u>Employee Ownership; Asset Ownership (IM3.3) & Risk to Agent (PIC10)</u>
[NC] **Asset Ownership expose employees to high levels of risk:** Asset Ownership introduces a trade-off between Risk to Agent and Gaming/Multitasking; at the cost of exposing the employee to more risk Gaming/Multitasking concerns are reduced. The employee now owns the asset and is thus exposed to additional risk; yet because it is the employee's asset the employee will take proper care of it. Refer to link IM→PIC24.

IM→PIC24) <u>Employee Ownership; Asset Ownership (IM3.3) & Gaming/Multitasking (PIC11)</u>
[NC] **Asset Ownership ensures employees will take proper care of machinery/assets:** Asset Ownership affects employees' incentives to deploy the asset carefully (Cai, 2003). This is especially useful in situations where employees may abuse assets, as an example "the problem that a piece rate system would lead to inadequate care [of a productive asset] can be mitigated or even eliminated" (Holmström & Milgrom, 1991, p. 25). Simply put "an agent who owns his machinery has better incentives to exercise due care" (Prendergast, 1999, p. 23). The benefits come at the cost of exposing the employee to risk as explained in link IM→PIC23.

IM→PIC25) <u>Salary (IM4) & Gaming/Multitasking (PIC11)</u>
a) [PG] **Salary-based incentive plans are individual based, which typically acts as a deterrent to social loafing:** Refer to link FIM→PIC20a.
b) [NG] **Salary-based incentive plans are individual based, which typically has a negative effect on cooperation:** Refer to link FIM→PIC20c.

IM→PIC26) <u>Salary (IM4) & Intrinsic Motivation (PIC12)</u>
[NG] **Salary-based incentive plans use tangible rewards as extrinsic motivators, which can have a negative effect on Intrinsic Motivation:** Refer to link FIM→PIC17.

IM→PIC27) Salary; Merit Pay (IM4.1) & Perceived Fairness (PIC6)

[NC] **Care has to be taken to ensure Merit Pay plans are perceived as fair and accurate:** Merit Pay plans can be complicated, multifaceted, and even incorporate aspects of tournaments. As per link FIM→PIC2, 6, and 14 Merit Pay is thus at risk of having a negative effect on Perceived Fairness. "If the performance measure is not perceived as being fair and accurate, the entire merit pay program can break down." (Noe, Hollenbeck, Gerhart, & Wright, 2006, p. 508).

IM→PIC28) Salary; Merit Pay (IM4.1) & Gaming/Multitasking (PIC11)

[NG] **Merit Pay can lead to a number of dysfunctional responses, especially if tournament related aspects are used:** Refer to link FIM→PIC4 and FIM→PIC5, and consider "Ranking and forced-distribution performance-rating systems need to be considered with caution, lest they contribute to behaviour that is too individualistic and competitive" (Noe, Hollenbeck, Gerhart, & Wright, 2006, p. 508).

IM→PIC29) Salary; Merit Pay (IM4.1) & Selection Effects (PIC13)

[PG] **Merit Pay can have positive Selection Effects:** "Too little emphasis on individual performance may leave the organization with average and poor performers" (Noe, Hollenbeck, Gerhart, & Wright, 2006, p. 508). As Merit Pay rewards individual performance positive Selection Effects occur as per link FIM→PIC13 and FIM→PIC22.

IM→PIC30) Salary; Efficiency Wages (IM4.2) & Performance Measurability (PIC4)

[I] **Efficiency Wages work well when performance is hard to measure:** As Efficiency Wages is not performance contingent it works well when "The organization has difficulties observing and monitoring its employees' performance" (Noe, Hollenbeck, Gerhart, & Wright, 2006, p. 466).

IM→PIC31) Salary; Efficiency Wages (IM4.2) & Perceived Competence (PIC8)

[PC] **Efficiency Wages has a positive effect on Perceived Competence:** Perceived Competence can be stimulated by the right competency signals (Aparicio, Vela, Sanchez, & Montes, 2012; Eisenberger & Rhoades, 1999). Efficiency Wages pays employees higher than market rates to make their jobs more valuable; this inherently sends a signal that the employee is valued, which enhances an employee's level of Perceived Competence.

IM→PIC32) Salary; Efficiency Wages (IM4.2) & Gaming/Multitasking (PIC11)

[PC] **Efficiency Wages typically decreases the likelihood of employees engaging in Gaming/Multitasking activities:** When employees are paid Efficiency Wages it "makes them less likely to shirk" (Prendergast, 1999, p. 44). "Employees who are paid more than they would be paid elsewhere will be reluctant to shirk because they wish to retain their jobs" (Noe, Hollenbeck, Gerhart, & Wright, 2006, p. 466).

IM→PIC33) Salary; Efficiency Wages (IM4.2) & Selection Effects (PIC13)

[PC] **Efficiency Wages has positive Selection Effects:** "The advantage of paying above the market average is the ability to attract and retain the top talent available, which can translate into a highly effective and production workforce" (Noe, Hollenbeck, Gerhart, & Wright, 2006, p. 466). The positive Selection Effects are complemented due to the individual focus of the Incentive Mechanisms as per link FIM→PIC22.

IM→PIC34) Salary; Deferred Compensation (IM4.3) & Career Concerns (PIC1)

[I] **New/young employees with long-term Career Concerns are typically more accepting of Deferred Compensation practices:** Deferred Compensation typically leads to workers being overpaid when they are old at the cost of being underpaid when they are young. Young individuals, or new employees, preoccupied by Career Concerns, "Concerns about the effects of current performance on future compensation" (Gibbons & Murphy, 1992, p. 468), would typically be more willing to accept this practice. "For large enough rents, older workers are willing to exert effort rather than be fired. But rents to older workers are also attractive to younger workers, because exerting effort increases the likelihood of surviving in the firm long enough to attain those rents" (Prendergast, 1999, p. 46).

IM→PIC35) Salary; Deferred Compensation (IM4.3) & Perceived Fairness (PIC6)

[NC] **Deferred Compensation has a negative effect on Perceived Fairness:** When Deferred Compensation is practiced "Firms often build seniority provisions into pay, promotion, and retention decisions, even when not warranted by productivity considerations" (Prendergast, 1999, p. 47). This poses a natural threat to Perceived Fairness, "There is a large behavioural literature arguing that treating employees differently from each other is detrimental to employee morale" (Baker, Jensen, & Murphy, 1988, p. 598).

IM→PIC36) Recognition (IM5) & Perceived Fairness (PIC6)

[I] **Recognition schemes are dependent on a certain level of Perceived Fairness:** "Employees need to know that the various Recognition programs offered across different employee populations and business units are fair and equitable" (Garr, 2012, p. 42). Link FIM→PIC2 and FIM→PIC6 should be considered. Perceived Fairness is important with any Incentive Mechanisms. It is emphasised with Recognition as Recognition works by stimulating the considerations that drive Intrinsic Motivation. This effect can thus be cancelled if Perceived Fairness is not taken into account. Refer to links PIC↔PIC39, 40, and 32.

IM→PIC37) Recognition (IM5) & Relatedness/Purpose (PIC9)

[PC] **Recognition Plans improves employee's sense of Relatedness/Purpose:** When appropriatelydesigned and implemented "Recognition 'communicates to employees that they are valued'" (Garr, 2012, p. 20).

IM→PIC38) Recognition (IM5) & Risk to Agent (PIC10)

[NG] **Recognition Plans, especially when performance contingent, exposes employee to some level of risk:** The non-linear nature of Recognition Plans, especially when performance contingent, put employees at risk of not receiving the desired Recognition for actions performed as per link FIM→PIC7.

IM→PIC39) Recognition (IM5) & Gaming/Multitasking (PIC11)

[NC] **Recognition programs are not immune to Gaming/Multitasking:** Even when subjective performance measures are used, as is often the case with Recognition Plans, employees can still manipulate the 'measurements' by currying favour instead of optimising performance (Prendergast, 1999). Link FIM→PIC4, 5, and 20 are to be kept in mind.

IM→PIC40) Recognition; Positive Feedback (IM5.1) & Performance Measurability (PIC4)

[I] **Positive Feedback can be used when performance is hard to measure:** While not limited to situations where performance is hard to measure, Positive Feedback can be a sensible option in such cases. In such settings Positive Feedback does not directly target bad behaviour, but indirectly affects it by stimulating positive attitudes or behaviour. "Verbal praise is an extrinsic motivator that positively alters attitudes and behavior" (Cameron & Pierce, 1994, p. 397). It follows that "Praising effective performance provides reinforcement for that behavior" (Noe, Hollenbeck, Gerhart, & Wright, 2006, p. 369).

IM→PIC41) Recognition; Positive Feedback (IM5.1) & Perceived Competence (PIC8)

[PC] **Positive Feedback improves an employee's level of Perceived Competence:** Sending Positive Feedback signals can lift an employee's level of Perceived Competence (Aparicio, Vela, Sanchez, & Montes, 2012; Eisenberger & Rhoades, 1999).

IM→PIC42) Recognition; Positive Feedback (IM5.1) & Risk to Agent (PIC10)

[PC] **Positive Feedback poses no downside risk to employees:** Positive Feedback holds no risk to employees. It might be argued that not receiving Positive Feedback in an environment where it is practiced can serve as some form of a risk; while this nuanced observation can be defended, incorporating it does not serve to enhance the usefulness of the model. Accounting for such levels of details will paralyse the model and render it ineffective.

IM→PIC43) Recognition; Positive Feedback (IM5.1) & Intrinsic Motivation (PIC12)

a) [PC] **Positive Feedback typically has a positive effect on Intrinsic Motivation:** It has been observed by leading behavioural scientists that "Positive performance feedback enhanced intrinsic motivation" (Ryan & Deci, 2000b, p. 70). This would be largely due to Positive Feedback having a positive effect on Perceived Competence and even on Relatedness/Purpose as per link IM→PIC41 and IM→PIC37. Both Perceived Competence and Relatedness/Purpose are drivers of Intrinsic Motivation as per link PIC↔PIC39 and PIC↔PIC40.

b) [PC] **Positive Feedback is not expected to crowd out Intrinsic Motivation:** As per link FIM→PIC17 Incentive Mechanisms can often lead to Intrinsic Motivation being crowded out. Positive Feedback does not employ tangible rewards, hence the crowding out effect is not expected to be overbearing. Note that Positive Feedback can still be constructed as an external motivator, Intrinsic Motivation can thus still be harmed as outlined in link FIM→PIC17.

IM→PIC44) Autonomy (IM6) & Perceived Fairness (PIC6)

[NG] **Autonomy as Incentive Mechanism generally has a negative effect on Perceived Fairness:** Autonomy as Incentive Mechanism typically uses subjective performance measures with non-linear performance requirements; this usually has a negative effect on Perceived Fairness as per link FIM→PIC2 and FIM→PIC6.

IM→PIC45) Autonomy (IM6) & Autonomy (PIC7)

[PC] **The Incentive Mechanism Autonomy inherently provides employees with more Autonomy:** While the Incentive Mechanism Autonomy inherently provides employees with more Autonomy it must be noted that this is only once it is awarded. Autonomy is typically provided for in Job Design, without being performance contingent, as provided for by links EJD→PIC1, 10, 13, and 23.

IM→PIC46) Autonomy (IM6) & Risk to Agent (PIC10)

[NG] **Autonomy as Incentive Mechanism typically uses subjective performance measures with non-linear performance requirements which exposes employees to certain risks:** See link FIM→PIC3 and FIM→PIC7.

IM→PIC47) Autonomy (IM6) & Gaming/Multitasking (PIC11)

[NG] **Autonomy as Incentive Mechanism typically uses subjective performance measures with non-linear performance requirements which introduces opportunities for Gaming/Multitasking:** See link FIM→PIC4 and FIM→PIC5.

IM→PIC48) Autonomy (IM6) & Intrinsic Motivation (PIC12)

[PC] **Using Autonomy as an Incentive Mechanism improves Intrinsic Motivation:** Using Autonomy as an Incentive Mechanism does little to crowd out Intrinsic Motivation; it is an intangible reward that stimulates one of the key drivers of Intrinsic Motivation as per link PIC↔PIC37. See also link FIM→PIC17.

IM→PIC49) Autonomy (IM6) & Selection Effects (PIC13)

[PC] **Autonomy as Incentive Mechanism attracts employees who value Autonomy:** Selection Effects are not limited to performance pay; More intricate sorting effects also come into play: "the particular institutional details of incentive schemes will attract different kinds of workers and generate sorting, thereby affecting the composition of the workforce" (Boudreau & Lakhani, 2011, p. 2). It follows that an incentive plan that revolves around Autonomy will be attractive to employees who value Autonomy as per link FIM→PIC19.

IM→PIC50) <u>Promotions (IM7) & Career Concerns (PIC1)</u>

[IC] **Employee with Career Concerns will be specifically concerned about promotion-related incentives:** Career Concerns focus on the effects of current performance on future compensation; ambitious employees and employees who simply value their job and want to retain it are thus affected. On the positive side it is noted that "Part of the return for promotion from rank a to b is not simply the pay difference between the two ranks, but also the increased prospect of further promotion to ranks c, d, and so on" (Prendergast, 1999, p. 51). On the other side of the spectrum the threat of Dismissals also has an effect on an employee's future compensation; employees who might not be ambitious, but still value their job, will be motivated by this mechanism.

IM→PIC51) <u>Promotions (IM7) & Agent's Level of Risk Aversion (PIC2)</u>

[IC] **Employees with a high level of risk aversion may prefer tournament-based Promotions:** Promotions are modelled "as single-period tournaments" and "under some conditions, risk-averse workers prefer tournaments to linear piece rates" (Baker, Jensen, & Murphy, 1988, p. 600). Note that Dismissals are not tournament-based, refer to link IM–FIM40.

IM→PIC52) <u>Promotions (IM7) & Team Production (PIC5)</u>

[NG] **Promotions can cause complications in team settings:** See link FIM→PIC11 and FIM→PIC23. These links are related to tournaments, note that Dismissals are not tournament-based, refer to link IM–FIM40.

IM→PIC53) <u>Promotions (IM7) & Perceived Fairness(PIC6)</u>

[NG] **Promotion typically operate in a tournament setting which can have a negative effect on Perceived Fairness:** See link FIM→PIC14. Note that Dismissals are not tournament-based, refer to link IM–FIM40.

IM→PIC54) <u>Promotions (IM7) & Perceived Competence (PIC8)</u>

[NG] **Promotions can have a negative effect on Perceived Competence:** The individual that is promoted receives a positive competence signal; the individuals that are not promoted receives a different signal. This can harm the level of Perceived Competence of employees who are not promoted as per link FIM→PIC9. While the phenomena is not perfectly avoidable when tournament related performance requirements are used designers would do well to minimise the effects and compensate where possible. Note that Dismissals are not tournament-based, refer to link IM–FIM40.

IM→PIC55) <u>Promotions (IM7) & Gaming/Multitasking (PIC11)</u>

a) [NC] **Promotions have no effect on average and poor performing employees:** "Incentives will be absent for employees who clearly fall short of the promotion standard" (Baker, Jensen, & Murphy, 1988, p. 600). This effect holds for individuals not under threat of Dismissals as well.

b) [NC] **Promotions are only effective when there is an opportunity for promotion**: When an individual is promoted it "diminishes the incentives of the employee's former co-workers who now expect to wait a long time until their next promotion opportunity" (Baker, Jensen, & Murphy, 1988, p. 600). This does not apply to Dismissals.

c) [NG] **Promotions, especially when tournament-based, can lead to complications in team settings:** See link FIM→PIC11. Note that Dismissals are not tournament-based, refer to link IM–FIM40.
d) [PG] **Promotions are not conducive to social loafing:** Even though promotion based incentive plans are group-based as per link IM–FIM39, only one individual receives the reward due to the tournament setting as per link IM–FIM39. An individual can thus not received a reward because of the individual's co-workers' performance, there is thus no danger of social loafing as discussed in link FIM→PIC20. The effect holds for Dismissals.

IM→PIC56) Promotions (IM7) & Intrinsic Motivation (PIC12)
[PG] **Promotion based incentive plans are not expected to crowd out Intrinsic Motivation:** As per link FIM→PIC17 Incentive Mechanisms can often lead to Intrinsic Motivation being crowded out. Promotion is not primarily a tangible reward, hence the crowding out effect is not expected to be overbearing. Note that Promotions can still be constructed as an external motivator, Intrinsic Motivation can thus still be harmed as outlined in link FIM→PIC17.

IM→PIC57) Promotions (IM7) & Selection Effects (PIC13)
a) [NC] **Promotions, especially through tournaments, can lead to a suboptimal resource allocation situation:** "Tournament promotion systems cannot in general match employees to the jobs for which they are best suited" (Baker, Jensen, & Murphy, 1988, p. 602). For tournament promotion systems a suboptimal resource allocation situation can be created as "the best performer at one level in the hierarchy is [in many cases] not the best candidate for the job one level up" (Baker, Jensen, & Murphy, 1988, p. 602). This effect does not hold for Dismissals.
b) [PG] **Promotions are attractive to high-performing employees:** Tournaments and other variable pay schemes typically attract productive workers as per link FIM→PIC13. This effect does not hold for Dismissals.

IM→PIC58) Promotions; Dismissals (IM7.1) & Risk to Agent (PIC10)
[NC] **The prominent use of Dismissals as an Incentive Mechanism expose employees, especially below average performing employees, to risk:** Setting where the threat of dismissal is emphasised exposes employee to a high amount of risk in the form of job uncertainty.

IM→PIC59) Promotions; Dismissals (IM7.1) & Intrinsic Motivation (PIC12)
[NC] **Dismissal as Incentive Mechanism can decrease Intrinsic Motivation:** Threats "diminish intrinsic motivation because, like tangible rewards, they conduce toward an external perceived locus of causality" (Ryan & Deci, 2000b, p. 70). This holds for the threat of dismissal.

Appendix B.4 – The IM–FIM Links (Links between IMs and FIMs)

This appendix contains the 42 links between the Incentive Mechanisms (IMs) and the Features of Incentive Mechanisms (FIMs) as identified and discussed in Chapter 10. Figure 10-7 through Figure 10-13 shows the visual representation of Link Model IM–FIM, the links between the IMs and the FIMs. It includes a designation for each link. This designation can be used to refer to the descriptive list of links in this appendix. The format of the list is as follows:

[Link number)] [Name of IM & FIM that is linked]
[Summary of the link's effect: Additional Information.]

IM–FIM1) Piece Rates/Commission (IM1) & Performance Measures (FIM1)
The performance measures for Piece Rates are typically objective: Objective measures are typically used for Piece Rates as they "are characterized by the fact that they can be verified for contractual purposes" (Prendergast, 1999, p. 12).

IM–FIM2) Piece Rates/Commission (IM1) & Performance Requirements (FIM2)
The performance requirements for Piece Rates are linear by definition: Piece Rates typically reward employee per unit produced or action taken. This is not to say that remuneration would be solely based on Piece Rates, Incentive Mechanisms are often used in conjunction with one another.

IM–FIM3) Piece Rates/Commission (IM1) & Reward Type (FIM3)
The reward when Piece Rates are used is typically monetary, this can be standalone or in addition to a base Salary/Wage: While various configurations can be designed Piece Rates are typically paid as, or as part of, Salary or Wages.

IM–FIM4) Piece Rates/Commission (IM1) & Target Audience (FIM4)
Piece Rates as an Incentive Mechanism is applied only to individuals: While the concept of reward per unit produced can be applied in group settings, Piece Rates as Incentive Mechanism focuses on individuals. When the concept is applied to groups certain effects will change; consider links FIM→PIC20 (target audience and Gaming/Multitasking) and FIM→PIC22 (target audience and Selection Effects) specifically.

IM–FIM5) Performance Bonuses (IM2) & Performance Measures (FIM1)
The performance measures for Performance Bonuses are not specified: Performance measures for Performance Bonuses can be objective, subjective, or a combination.

IM–FIM6) Performance Bonuses (IM2) & Performance Requirements (FIM2)
The performance requirements for Performance Bonuses are not specified: While quotas or milestones are often used alternative linear measures can also be used as is typical with Profit-sharing and Gainsharing plans.

IM–FIM7) Performance Bonuses (IM2) & Performance Requirements; Tournaments (FIM2.1)
Tournaments are not typically used for Performance Bonuses: While bonuses would not typically be awarded via tournaments it is an option, adverse effects should however be carefully considered (see link FIM→PIC11 and FIM→PIC14).

IM–FIM8) Performance Bonuses (IM2) & Reward Type (FIM3)
The reward when Piece Rates are used is typically monetary and in addition to base pay: Performance Bonuses are typically in the form of 'an extra amount of money', 'a one-time payment', or a 'cash lump-sum payment'.

IM–FIM9) Performance Bonuses (IM2) & Target Audience (FIM4)
The target audience for Performance Bonuses is not specified: There is no specified target audience. A Performance Bonus can be applied to individuals, groups, or the organisation as a whole.

IM–FIM10) Performance Bonuses; Gainsharing (IM2.1) & Performance Measures (FIM1)
Gainsharing uses objective performance measures: Gainsharing is typically based on some objective measure of group or team performance such as productivity or profits.

IM–FIM11) Performance Bonuses; Gainsharing (IM2.1) & Target Audience (FIM4)
The target audience for Gainsharing is a group or team: Gainsharing is focused on a group of employees; not individuals or the company as a whole. This can be for a team, site, plant, or work group.

IM–FIM12) Performance Bonuses; Profit-sharing (IM2.2) & Performance Measures (FIM1)
Profit-sharing uses objective performance measures: Profit-sharing is typically based on some objective measure of organisational performance.

IM–FIM13) Performance Bonuses; Profit-sharing (IM2.2) & Target Audience (FIM4)
The target audience for Profit-sharing is typically all employees: Profit-sharing typically covers the whole organisation. Certain employees or groups of employees will often be rewarded or motivation by other mechanisms as well.

IM–FIM14) Employee Ownership (IM3) & Performance Measures (FIM1)
The performance measures for Employee Ownership plans are typically objective: Objective measures for performance are typically used for Employee Ownership plans. This allows plans to be verified for contractual purposes. Measures typically include stock prices or company value.

IM–FIM15) Employee Ownership (IM3) & Performance Requirements (FIM2)
The performance requirements for Employee Ownership plans are typically linear: Employee Ownership typically distributes a portion of the company or a certain amount of stock or shares to employees. Performance requirements are thus linear and directly related to the value or the stock of the company. This is not to say that some thresholds cannot be include in the design.

IM–FIM16) Employee Ownership (IM3) & Reward Type (FIM3)

The reward type for Employee Ownership plans is mainly monetary, but can be designed to include intangible aspects: Employee Ownership plans reward employees with a portion of the business, or a portion of the growth of the business. This can be through stock, shares, or ownership. While especially low level employees in large organisations would typically experience the reward type as tangible, this does not hold universally. When the share is large enough and the time period long enough employees can experience a sense of ownership. In addition to the tangible monetary component this serves as an intangible reward; consider growth prospects, employees' sense of pride or self-esteem, and security.

IM–FIM17) Employee Ownership (IM3) & Target Audience (FIM4)

The target audience for Employee Ownership plans are not specified: There is no specified target audience. Employee Ownership plan can be applied to individuals, groups, or the organisation as a whole.

IM–FIM18) Employee Ownership; Stock Options (IM3.1) & Performance Requirements (FIM2)

The performance requirements for Stock Option plans are typically linear only on the positive side: Stock Options typically "gives employees the opportunity to buy the company's stock at a previously fixed price" (Noe, Hollenbeck, Gerhart, & Wright, 2006, p. 514). Employees are thus rewarded in a linear fashion for any growth, but have no risk on the negative side.

IM–FIM19) Salary (IM4) & Reward Type (FIM3)

The reward type for Salary related Incentive Mechanisms is typically tangible, specifically monetary and related to an employee's salary: Salary related Incentive Mechanisms use modifications to an employee's Salary to create an Incentive Mechanism. This can be in the form of performance contingent Salary revisions, a practice of paying higher than standard market rates to increase a job's value to an employee, or deferring income to create an expectation of higher future payments.

IM–FIM20) Salary (IM4) & Target Audience (FIM4)

The target audience for Salary related Incentive Mechanisms is typically individuals: While it might be the case that the same Incentive Mechanisms is applied to various individuals, Salary related Incentive Mechanisms are typically done per individual. Other employee might thus receive the same incentive as a certain individual, yet their performance will not influence the individual's incentive.

IM–FIM21) Salary; Merit Pay (IM4.1) & Performance Measures (FIM1)

The performance measures for Merit Pay are typically a mixture of objective and subjective measures: Merit Pay is "determined by an assessment of individual performance at work" (Cornelius, 2001, p. 168). The assessment is typically based on a mixture of objective and subjective measures; easily determined criteria and "performance appraisal ratings" (Noe, Hollenbeck, Gerhart, & Wright, 2006, p. 504).

IM–FIM22) Salary; Efficiency Wages (IM4.2) & Performance Measures (FIM1) + Performance Requirements (FIM2)

Efficiency Wages uses no performance measures and thus has no performance requirements: Efficiency Wages is the practice of paying employees higher than market rates to make their jobs more valuable to them. It is thus not performance contingent and uses no performance measures or performance requirements. It must be noted that Efficiency Wages can work in conjunction with other Incentive Mechanisms, the fear of Dismissals will for example be much more effective. It could be argued that two thresholds exist that can be thought of as performance criteria; getting hired and not getting dismissed. This would suggest a mixture of objective and subjective performance measures and non-linear performance requirements.

IM–FIM23) Salary; Deferred Compensation (IM4.3) & Performance Measures (FIM1)

The performance measures for Deferred Compensation is objective: Deferred Compensation simply considers the time an employee has been with a business or organisation.

IM–FIM24) Salary; Merit Pay (IM4.1) & Performance Requirements (FIM2)

The performance requirements for Merit Pay is not specified: While there is no set rule for Merit Pay's performance requirements a rating criteria is often used to match performance with rewards. This can be in a linear fashion or follow a more complicated non-linear formula.

IM–FIM25) Salary; Deferred Compensation (IM4.3) & Performance Requirements (FIM2)

The performance requirements for Deferred Compensation are not defined: Deferred Compensation considers how long an employee has been with an organisation. Whether the corresponding increase in remuneration is linear or subject to certain thresholds is up to the discretion of the company.

IM–FIM26) Salary; Merit Pay (IM4.1) & Performance Requirements; Tournaments (FIM2.1)

Merit Pay systems can use tournament related ranking systems: Merit Pay plans can utilise "Ranking and forced-distribution performance-rating systems" (Noe, Hollenbeck, Gerhart, & Wright, 2006, p. 508).

IM–FIM27) Recognition (IM5) & Performance Measures (FIM1)

The performance measures for Recognition Plans are not defined: Recognition Plans "may be informal or discretionary" (CIPD, 2015) or incorporate some measure of an employee's behaviour, activities, or impact in an organisation.

IM–FIM28) Recognition (IM5) & Performance Requirements (FIM2)

The performance requirements for Recognition Plans are non-linear: Recognition Plans do not make use of linear performance measures. Some plans may set quotas or milestones, and other plans "may be informal or discretionary" (CIPD, 2015).

IM–FIM29) Recognition (IM5) & Reward Type (FIM3)

The reward type for Recognition Plans is not defined: Recognition can be in the form of praise, emblematic rewards, token rewards, or monetary rewards (Garr, 2012).

IM–FIM30) Recognition (IM5) & Target Audience (FIM4)

The target audience for Recognition Plans is not specified: There is no specified target audience. Recognition Plans can be applied to individuals, groups, or the organisation as a whole. Note that the effects of links IM→PIC36, 41, 37, and 43 are expected to be diluted as group size increases.

IM–FIM31) Recognition; Positive Feedback (IM5.1) & Reward Type (FIM3)

The reward type for Positive Feedback is intangible: Positive Feedback serves as an intangible reward by definition.

IM–FIM32) Autonomy (IM6) & Performance Measures (FIM1)

The performance measures for Autonomy as Incentive Mechanism are typically subjective: Autonomy as an Incentive Mechanism is contingent on performance. Measures will typically be subjective and can even be informal. One scenario might be where an employee is granted more Autonomy, even if only by not being micro-managed, when the employee has proven the employee's capabilities and trustworthiness; in this scenario the reward is performance contingent and measured subjectively.

IM–FIM33) Autonomy (IM6) & Performance Requirements (FIM2)

The performance requirements for Autonomy as Incentive Mechanism are typically non-linear: Autonomy as an Incentive Mechanisms is typically contingent on some subjective, even informal, performance requirement. In many cases it can be granted in a greater degree over time. While there can be some linearity in certain conditions, the performance requirements are typically non-linear.

IM–FIM34) Autonomy (IM6) & Reward Type (FIM3)

The reward type for Autonomy as Incentive Mechanism is the provision of more Autonomy to employees: By definition the reward type for Autonomy as Incentive Mechanisms is a greater degree of Autonomy.

IM–FIM35) Autonomy (IM6) & Target Audience (FIM4)

The target audience for Autonomy as Incentive Mechanism is not specified: There is no specified target audience. Autonomy as Incentive Mechanism can be applied to individuals, groups, or the organisation as a whole.

IM–FIM36) Promotions (IM7) & Performance Measures (FIM1)

The performance measures for Promotions are typically a combination of objective and subjective measures: "Promotion decisions, for example, are typically based on a combination of objective and subjective criteria" (Baker, Gibbons, & Murphy, 1994, p. 1154).

IM–FIM37) <u>Promotions (IM7) & Performance Requirements; Tournaments (FIM2.1)</u>

Tournaments are typically used as performance requirements for Promotions: Promotions are typically modelled "as single-period tournaments" (Baker, Jensen, & Murphy, 1988, p. 600) or related to tournament theory (Prendergast, 1999). Adverse effects should be carefully considered as highlighted in link FIM→PIC11 and FIM→PIC14.

IM–FIM38) <u>Promotions (IM7) & Reward Type (FIM3)</u>

The reward type for Promotions as Incentive Mechanism is a promotion: By definition the reward type for Promotions as Incentive Mechanism is a promotion. Even though monetary benefits are typically included, a range of intangible benefits form part of the reward.

IM–FIM39) <u>Promotions (IM7) & Target Audience (FIM4)</u>

The target audience for Promotions as Incentive Mechanism is the better-performing portion of a group of employees: When used as an Incentive Mechanism Promotions target a group of employees. It is noted that this Incentive Mechanism is only effective with employees who expect to have some chance of success; "Incentives will be absent for employees who clearly fall short of the promotion standard" (Baker, Jensen, & Murphy, 1988, p. 600).

IM–FIM40) <u>Promotions; Dismissals (IM7.1) & Performance Requirements (FIM2)</u>

The performance requirements for Dismissals as Incentive Mechanism are typically non-linear: Dismissals as an Incentive Mechanism operates as a threat contingent on some minimum level of performance.

IM–FIM41) <u>Promotions; Dismissals (IM7.1) & Reward Type (FIM3)</u>

The reward type for Dismissals as Incentive Mechanism is continued employment: By definition the reward type for Dismissals as Incentive Mechanism is continued employment. Even though monetary benefits are typically included a range of intangible benefits form part of the reward.

IM–FIM42) <u>Promotions; Dismissals (IM7.1) & Target Audience (FIM4)</u>

The target audience for Dismissals as Incentive Mechanism is employees who are performing poorly: When used as an Incentive Mechanism Dismissals target a group of employees. In much the same way that Promotions are only effective for employees who perform well, Dismissals are only effective for employees who perform poorly.

Appendix B.5 – The EJD→PIC Links (Links between PICs and EJD)

This appendix contains the 26 links between the 13 PICs the Elements of Job Design (EJD) as identified and discussed in Chapter 11. Figure 11-2 shows the visual representation of Link Model EJD→PIC, the links between the PICs and EJD. It includes a designation for each link. This designation can be used to refer to the descriptive list of links in this appendix. The format of the list is as follows:

[Link number)] [Name of EJD and & PIC that is linked]
[Summary of the link's effect: Additional Information.]

- [2nd-degree link specifics and further information]

EJD→PIC1) Autonomy (EJD1) & Autonomy (PIC7)
Job design can be used to modify an agent's level of Autonomy: Job design can be used to influence the various facets of Autonomy (Method, Scheduling, Criteria, and Team Autonomy).

- This is a special case as Autonomy is recognised both as one of the 13 PICs and as a lever that can be influenced by Job Design. The links between Autonomy and the other PICs (links PIC↔PIC24, 21, 13, 8, 38, 37, 36, 35, 34, and 33) are well documented in the section dealing with the connections between PICs. Job Design literature links Autonomy to both objective and subjective ratings, lower absenteeism, positive well-being outcomes, reduced role ambiguity and conflict, increased job satisfaction, increased organisational commitments, and increased internal motivation.

EJD→PIC2) Task Significance (EJD2) & Relatedness/Purpose (PIC9)
Improving Task Significance improves Relatedness/Purpose: Job Design can be used to design tasks so that they seem more significant. This involves the degree to which a job impacts the lives of others, both inside and outside the organisation.

- Task Significance is noted as having various links involving Intrinsic Motivation; Task Significance is linked to increased job satisfaction, increased organisation commitment, increased work motivation, increased subjective performance ratings, lower burnout, and increased perceptions of overload. This is largely due to the link between Relatedness/Purpose and Intrinsic Motivation (link PIC↔PIC40) as documented in the connections/relationships between PICs section.

EJD→PIC3) Feedback from Job (EJD3) & Performance Measurability (PIC4)
Improving the feedback a job provides about an individual's performance improves Performance Measurability: Various aspects of a task, job, or the work environment can be designed for to improve feedback allowing for better performance measures.

- Feedback from Job is noted as having some links with Risk to Agent; feedback form job is linked to increased role ambiguity, increased role conflict, and increased anxiety. The connections between PICs discusses the link between performance measures and Risk to Agent (link PIC↔PIC22).

EJD→PIC4) Feedback from Job (EJD3) & Perceived Competence (PIC8)

Ensuring a job imparts information about an individual's performance, especially when positive, can improve Perceived Competence: Designing a job or work environment so that it sends Positive Feedback can lift an employee's level of Perceived Competence (Aparicio, Vela, Sanchez, & Montes, 2012; Eisenberger & Rhoades, 1999).

- Feedback from Job is linked to Intrinsic Motivation through increased work motivation and increased job satisfaction. This is due to the link between Perceived Competence and Intrinsic Motivation (link PIC↔PIC39) as documented in the connections between PICs section.

EJD→PIC5) Task Identify (EJD4) & Relatedness/Purpose (PIC9)

Improving Task Identify stimulates an individual's sense of purpose: Designing tasks in such a way that an individual completes an entire piece of work can instil pride in the worker and improve an individual's sense of ownership. This improves employees' sense of purpose.

- Task identity is noted as having various links involving Intrinsic Motivation; task identity is linked to increased worker motivation, increased organisational commitment, increased job satisfaction, increased subjective performance evaluation, decreased absenteeism, decreased role conflict, and decreased burnout. This is largely due to the link between Relatedness/Purpose and Intrinsic Motivation (link PIC↔PIC40) as documented in the connections/relationships between PICs section.

EJD→PIC6) Task Variety (EJD5) & Job Complexity (PIC3)

Task Variety can be used to affect Job Complexity: Designing jobs with a larger or smaller variety of tasks influences Job Complexity.

- Task Variety is linked to Performance Measurability and Intrinsic Motivation; Task Variety is link to increased job satisfaction, increased subjective performance ratings, and increased perception of job overload. This is due to the link between Job Complexity and Performance Measurability (link PIC↔PIC12) and the link between Job Complexity and Intrinsic Motivation (link PIC↔PIC17) as documented in the connections between PICs section.

EJD→PIC7) Job Complexity (EJD6) & Job Complexity (PIC3)

Job Design can be used to modify and agent's level of Job Complexity: Job Design can be used to influence the extent to which a job is multifaceted and difficult to perform.

- This is a special case as Job Complexity is recognised both as one of the 13 PICs and as a lever that can be influenced by Job Design. The links between Job Complexity and the other PICs (links PIC↔PIC6, 12, 13, 14, 15, 16, 17, and 18) are well documented in the section dealing with the connections between PICs.

EJD→PIC8) <u>Information Processing (EJD7) & Job Complexity (PIC3)</u>

Modifying Information Processing requirements affects Job Complexity: Modifying the extent to which a job necessitates an incumbent to focus on and manage information can be used to influence Job Complexity.

- Information Processing is vaguely linked to Intrinsic Motivation; limited research links Information Processing to increased perception of job satisfaction, increased compensation, and increased training requirements. This is due to the link between Job Complexity and Intrinsic Motivation (link PIC↔PIC17) as documented in the connections between PICs section.

EJD→PIC9) <u>Problem-solving (EJD8) & Job Complexity (PIC3)</u>

A job's Problem-solving requirements affects Job Complexity: The extent to which unique ideas or solutions are needed in a job influences Job Complexity.

- Problem-solving is linked to Risk to Agent and Intrinsic Motivation; limited research suggests effects that can be both satisfying and demanding for the worker. This is partly due to the link between Job Complexity and Risk to Agent (link PIC↔PIC15) and the link between Job Complexity and Intrinsic Motivation (link PIC↔PIC17) as documented in the connections between PICs section.

EJD→PIC10) <u>Problem-solving (EJD8) & Autonomy (PIC7)</u>

High Problem-solving requirements result in (method) Autonomy: When a high degree of unique ideas or solutions are needed in a job an individual will experience a degree of method Autonomy.

- Problem-solving is linked to Risk to Agent and Intrinsic Motivation; limited research suggests effects that can be both satisfying and demanding for the worker. This is partly due to the link between Autonomy and Risk to Agent (link PIC↔PIC35) and the link between Autonomy and Intrinsic Motivation (link PIC↔PIC37) as documented in the connections between PICs section.

EJD→PIC11) <u>Specialisation (EJD9) & Job Complexity (PIC3)</u>

The degree of Specialisation involved with a job affects Job Complexity: The degree to which specialised tasks are performed, or specialised knowledge and skill is needed for job performance affects Job Complexity.

- Specialisation is linked to Intrinsic Motivation; limited research links Specialisation to increased job satisfaction and increased efficiency. This is due to the link between Job Complexity and Intrinsic Motivation (link PIC↔PIC17) as documented in the connections between PICs section.

EJD→PIC12) <u>Skill Variety (EJD10) & Job Complexity (PIC3)</u>

Increasing the Skill Variety in a job increases Job Complexity: The extent to which various skills are needed for job performance will affect Job Complexity.

- Skill Variety is linked to Intrinsic Motivation; Skill Variety is thought to engage workers as using numerous skills in the course of work is challenging. This is partly due to the link between Job Complexity and Intrinsic Motivation (link PIC↔PIC17) as documented in the connections between PICs section.

EJD→PIC13) Skill Variety (EJD10) & Autonomy (PIC7)

Skill Variety can increase perceptions of Autonomy: The extent to which various skills are needed for job performance provides more scope for method and scheduling Autonomy.

- Skill Variety is linked to Intrinsic Motivation; Skill Variety is thought to engage workers as using numerous skills in the course of work is challenging. This is partly due to the link between Autonomy and Intrinsic Motivation (link PIC↔PIC37) as documented in the connections between PICs section.

EJD→PIC14) Interaction - outside organisation and with beneficiaries (EJD11) & Relatedness/Purpose (PIC9)

Increased Interaction outside the organisation improves Relatedness/Purpose: The extent to which an individual must interact and communicate with people external to the organisation increases the perceived significance of a task.

- Interaction (outside) is linked to Intrinsic Motivation; Interaction (outside) is linked to increased job satisfaction and higher levels of persistence. This is largely due to the link between Relatedness/Purpose and Intrinsic Motivation (link PIC↔PIC40) as documented in the connections/relationships between PICs section.

EJD→PIC15) Interdependence (EJD12) & Team Production (PIC5)

Interdependence drives Team Production: Team Production can be controlled through Job Design by altering various facets of Interdependence. Interdependence is a multi-faceted construct reflecting the extent to which workers are connected to others. It is composed of Task Interdependence, Goal Interdependence, and Outcome Interdependence:

i. Between Jobs/roles: Task Interdependence is the extent to which a job requires others, and other jobs require the output of the focal job.
ii. Between teams: Goal Interdependence is the extent to which an individual's goals overlap with another person's.
iii. Feedback, rewards, and goals: Outcome Interdependence is the extent to which a worker's feedback and rewards are linked to another person's.

- Interdependence is linked to Intrinsic Motivation and Relatedness/Purpose; Interdependence is linked to increased satisfaction and organisational commitment, increased motivation, higher levels of overload, higher performance. This is largely due to the link between Team Production and Relatedness/Purpose (link PIC↔PIC25) and the link between Team Production and Intrinsic Motivation (link PIC↔PIC28) as documented in the connections/relationships between PICs section.

EJD→PIC16) <u>Feedback from Others (EJD13) & Perceived Competence (PIC8)</u>

Feedback from Others can be used to stimulate Perceived Competence: Modifying the extent to which members of the organisation provide information about job performance to one another can stimulate Perceived Competence.

- Feedback from Others is linked to Intrinsic Motivation; Feedback from Others is linked to decreased role ambiguity, increased performance, increased well-being, increased satisfaction, increased work motivation, and decreased turnover intentions. This is partly due to the link between Perceived Competence and Intrinsic Motivation (link PIC↔PIC39) as documented in the connections/relationships between PICs section.

EJD→PIC17) <u>Feedback from Others (EJD13) & Relatedness/Purpose (PIC9)</u>

Feedback from Others affects Relatedness/Purpose: Modifying the extent to which members of the organisation provide information about job performance to one another can help employees to feel more meaningfully connected to each other.

- Feedback from Others is linked to Intrinsic Motivation; Feedback from Others is linked to decreased role ambiguity, increased performance, increased well-being, increased satisfaction, increased work motivation, and decreased turnover intentions. This is partly due to the link between Relatedness/Purpose and Intrinsic Motivation (link PIC↔PIC40) as documented in the connections/relationships between PICs section.

EJD→PIC18) <u>Social Support (EJD14) & Relatedness/Purpose (PIC9)</u>

Providing Social Support enhances Relatedness/Purpose: Improving the extent to which there are opportunities for assistance and advice from supervisors and co-workers can help employees to feel more meaningfully connected to each other.

- Social Support is linked to Intrinsic Motivation; Social Support is linked to increased organisational commitment, increased job satisfaction, decreased turnover intentions, decreased role ambiguity, and decreased role conflict. This is largely due to the link between Relatedness/Purpose and Intrinsic Motivation (link PIC↔PIC40) as documented in the connections/relationships between PICs section.

EJD→PIC19) <u>Work Conditions (EJD15) & Risk to Agent (PIC10)</u>

Work Conditions can be modified to decrease Risk to Agent: Working conditions can be designed to reduce Risk to Agent and alleviate stress. Work Conditions are components of the work context, including noise, health hazards, and temperature.

- Work Conditions are linked to Intrinsic Motivation; Work Conditions are lined to decreased job satisfaction and increased stress. This is due to the link between Risk to Agent and Intrinsic Motivation (link PIC↔PIC11 which is compounded by Agent's Level of Risk Aversion) as documented in the connections/relationships between PICs section.

EJD→PIC20) Physical Demands (EJD16) & Intrinsic Motivation (PIC12)

Physical Demands can reduce Intrinsic Motivation: Job Design can control for excessive Physical Demands which hamper Intrinsic Motivation. Physical Demands has been linked to decreased job satisfaction.

EJD→PIC21) Equipment Use (EJD18) & Job Complexity (PIC3)

Equipment Use affects Job Complexity: The variety and complexity of the technology and equipment used in a job affects Job Complexity.

EJD→PIC22) Ergonomics (EJD19) & Intrinsic Motivation (PIC12)

Ergonomic considerations support Intrinsic Motivation: When jobs are not designed to allow for correct posture and movement employee motivation can be hampered. Ergonomics has been linked to increased job satisfaction and efficiency.

EJD→PIC23) Workload (EJD20) & Autonomy (PIC7)

An excessive Workload can hamper perceived Autonomy: When an employee's Workload is excessive the employee will start to feel controlled or pressured as opposed to feeling internal assent regarding the employee's own behaviour. On a physical level scheduling Autonomy could also be hampered by excessive Workloads.

EJD→PIC24) Workload (EJD20) & Perceived Competence (PIC8)

A balanced Workload fosters Perceived Competence: Designing a job so that the Workload presents optimal challenges to employees, challenges that are in line with employees abilities, will improve the employees' level of Perceived Competence.

EJD→PIC25) Organisational Support (EJD20) & Perceived Competence (PIC8)

Good Organisational Support improves Perceived Competence: Perceived Organisational Support is thought to contribute to employees' feelings of competence and worth by conveying the organisation's positive valuation of an employee's work and care for the employee's well-being (Rhoades & Eisenberger, 2002; Eisenberger, Armeli, Rexwinkel, Lynch, & Rhoades, 2001; George & Brief, 1992).

EJD→PIC26) Virtuality of Work (PIC22) & Relatedness/Purpose (PIC9)

The Virtuality of Work can stifle Relatedness/Purpose: When the degree to which individuals are collocated and/or utilise technology for mediating their communication is excessive employees can suffer a reduced sense of relatedness or purpose.

- Virtuality of Work is linked to Intrinsic Motivation; Virtuality of Work is linked to increased role ambiguity and conflict, increased depersonalisation leading to decreased morale. This is partly due to the link between Relatedness/Purpose and Intrinsic Motivation (link PIC↔PIC40) as documented in the connections/relationships between PICs section.

Appendix B.6 – The EJD→IM Links (Links between IMs and EJD)

This appendix contains the 14 links between the between the Incentive Mechanisms (IMs) and the Elements of Job Design (EJD) as identified and discussed in Chapter 12. Figure 12-2 shows the visual representation of Link Model EJD→IM, the links between the IMs and the EJD. It includes a designation for each link. This designation can be used to refer to the descriptive list of links in this appendix. The format of the list is as follows:

[Link number)] [<u>Name of EJD and & IM that is linked</u>]
[Summary of the link's effect: Additional Information.]

EJD→IM1) <u>Autonomy (EJD1) & Autonomy (IM6)</u>
Job Design enables the reward for Autonomy as Incentive Mechanism: Job Design can be used to influence various facets of a job's Autonomy (Method, Scheduling, Criteria, and Team Autonomy). This allows a job to be altered so that employees can be rewarded with higher levels of Autonomy which enables the use of IM6.

EJD→IM2) <u>Feedback from Job (EJD3) & Piece Rates/Commission (IM1)</u>
Designing jobs to give better feedback improves the effectiveness of Piece Rates: Piece Rates rely on objective measures of performance. If a job provides better feedback concerning an individual's performance the accuracy and effectiveness of Piece Rates can be improved.

EJD→IM3) <u>Feedback from Job (EJD3) & Performance Bonuses (IM2)</u>
Designing jobs to give better feedback improves the effectiveness of Performance Bonuses: Performance Bonuses are often, at least partly, based on objective performance measures. If a job provides better performance feedback the accuracy and effectiveness of Performance Bonuses can be improved. This does not hold for Profit-sharing.

EJD→IM4) <u>Feedback from Job (EJD3) & Merit Pay (IM4.1)</u>
Designing jobs to give better feedback improves the effectiveness of Merit Pay: Merit Pay is often, at least partly, based on objective performance measures. If a job provides better feedback concerning an individual's performance the accuracy and effectiveness of Merit Pay can be improved.

EJD→IM5) <u>Task Identity (EJD4) & Piece Rates (IM1)</u>
Designing jobs so that an individual completes an entire piece of work allows the use of Piece Rates: Piece Rates is based on a physical measurement of units produced or actions performed. If a job can be designed in such a way that such 'units' can be distinguished the use of Piece Rates becomes possible. Task Identity has some bearing on this as it is concerned with designing a job so that an individual completes an entire piece of work.

EJD→IM6) Interdependence (EJD12) & Piece Rates (IM1)

Designing jobs so that there is little Task Interdependence improves the effectiveness of Piece Rates: As Piece Rates focus on an individual's performance it works well in settings where employees are not dependent on each other. Designing a job so that there is no Task Interdependence allows the Piece Rates to be used more effectively.

EJD→IM7) Interdependence (EJD12) & Gainsharing (IM2.1)

Designing jobs where groups of employees have Goal Interdependence and Outcome Interdependence improves the effectiveness of Gainsharing: Gainsharing rewards a group of employees based on the performance of the group or unit. Designing the employees' jobs in such a manner that there is a great degree of Interdependence improves the effectiveness of Gainsharing.

EJD→IM8) Feedback from Others (EJD13) & Performance Bonuses (IM2)

Designing jobs so that employees can give better feedback about performance improves the effectiveness of Performance Bonuses: Performance Bonuses are often, at least partly, based on subjective performance measures. If better performance feedback is available the accuracy and effectiveness of Performance Bonuses can be improved. This does not hold for Gainsharing and Profit-sharing as they use objective performance measures.

EJD→IM9) Feedback from Others (EJD13) & Merit Pay (IM4.1)

Designing jobs so that employees can give better feedback about performance improves the effectiveness of Merit Pay: Merit Pay is often, at least partly, based on subjective performance measures. If better feedback concerning an individual's performance is available the accuracy and effectiveness of Merit Pay can be improved.

EJD→IM10) Feedback from Others (EJD13) & Recognition (IM5)

a) Designing jobs so that employees can give better feedback about performance improves the effectiveness of Recognition: Recognition is often, at least partly, based on subjective performance measures. If better feedback concerning an individual's performance is available the accuracy and effectiveness of Recognition Plans can be improved.

b) Designing jobs so that employees can give better feedback about performance improves the availability of Recognition Plans: Recognition and feedback can come from various avenues. Designing jobs so that more members can provide information about performance introduces more Recognition plan options.

EJD→IM11) Feedback from Others (EJD13) & Autonomy (IM6)

Designing jobs so that employees can give better feedback about performance improves the effectiveness of Autonomy as IM: Autonomy as IM is usually based on subjective performance measures. If better feedback concerning an individual's performance is available the accuracy and effectiveness of Autonomy as IM can be improved.

EJD→IM12) Feedback from Others (EJD13) & Promotions (IM7)

Designing jobs so that employees can give better feedback about performance improves the effectiveness of Promotions: Promotions based incentive plans are often, at least partly, based on subjective performance measures. If a job provides better feedback concerning an individual's performance the accuracy and effectiveness of Promotions can be improved.

EJD→IM13) Equipment Use (EJD18) & Asset Ownership (IM3.3)

Job Design can be used to create a situation where Asset Ownership can be implemented: Asset Ownership requires equipment or asset that is not only operated, but owner, by the same people. Job Design can be used to create a situation where equipment is used in such a way that this is possible.

EJD→IM14) Feedback from Job (EJD3) & Promotions (IM7)

Designing jobs so that the job gives better feedback about performance improves the effectiveness of Promotions: Promotions based incentive plans are often, at least partly, based on objective performance measures. If a job provides better feedback concerning an individual's performance the accuracy and effectiveness of Promotions can be improved.

Appendix C – Unrefined Links

Appendix C.1 – The Initial Links between PICs (The iPIC↔PIC Links)

The following list contains the initial links that were identified between the 13 PICs. While this list is the basis that the final list stems from, many refinements and updates were necessary (see Chapter 9.3). The final list, the PIC↔PIC Links, can be found in Appendix B.1. The format for each item is as follows:

[Link number] <u>[Names of PICs that are linked]</u>
[(link form)(source)] **Summary of the link's effect**: Justification and explanation.

Key:

- Link form:
  - [P] Positively Related or Opportunities: Improving one PIC generally improves the other.
  - [N] Negatively Related or Threats: Improving one PIC is generally at the cost of the other.
  - [S] Special Considerations: Certain condition in relation to one PIC that another PIC should react to in a specific way.
- Source:
  - [1] Key Influential Works.
  - [2] Alternative Literature.
  - [3] Inference.

iPIC↔PIC1) <u>Career Concerns & Agent's Level of Risk Aversion</u>
a) [N2] **The higher an employee's level or risk aversion the higher the cost of Career Concerns as a means of motivation becomes**: Motivating employees through Career Concerns introduces a lag time between effort exerted and reward, hence uncertainty enters the decision-making process of employees (unexpected events may occur resulting in the reward not obtained). "This problem implies that the risk attitude of employees will be an important condition for the success or failure of career enhancement" (Lambooij, Flache, & Siegers, 2009, p. 308).
b) [S3] **A high level of risk aversion coupled with a reputation to protect, or a low level of risk aversion coupled with less reputational concerns can lead to overly cautious behaviour or unwarranted risk taking**: Situations may arise where; agents who have good reputations are unwilling to take risks that might harm their reputation, or agents who are not well known may take risks to draw attention to themselves. In both instances the behaviour might not be optimal and should be controlled for. It should always be kept in mind that "a manager is concerned about both the market's perception of his ability and the variation in such perception" (Chen & Jiang, 2006, p. 29).

iPIC↔PIC2) <u>Career Concerns & Performance Measurability</u>

[P1] **The higher an agent's level of visibility the more effective Career Concerns will be**: Visibility inside the firm enables the hope for Promotions while visibility outside the firm enables the hope for future private sector employment. If an agent does not perceive the agent's actions as visible Career Concerns will not be effective; Prendergast (1999, p. 53) echoes this when he discusses Career Concerns under noisy measures, they fall as "there is little updating on ability".

iPIC↔PIC3) <u>Career Concerns & Perceived Fairness</u>

[N3] **Promotion practices can lower Perceived Fairness**: Career Concerns often function as an implicit incentive, there is thus no contract, and performance measurement is subjective. This provides transparency challenges that can lead to issues such as perceived favouritism. Care must be taken as practices surrounding Career Concerns touch on many factors that have been identified as having a bearing on Perceived Fairness, this includes; transparency, trust, reneging, favouritism, and degree of subjectivity.

iPIC↔PIC4) <u>Career Concerns & Risk to Agent</u>

[N2] **Career Concerns introduces risk to the agent**: Career Concerns often use subjective, less transparent, measures and introduce a lag time between effort exerted and reward. "When an employee decides to invest extra effort to cooperate with the firms' interest, it may well be that between the moment of investment and the future reward some unexpected event occurs due to which the reward will not be obtained" (Lambooij, Flache, & Siegers, 2009, p. 308).

iPIC↔PIC5) <u>Career Concerns & Selection Effects</u>

[P3] **Providing for Career Concerns is likely to attract better employees**: Skilled employees with long-term aspirations are likely to be drawn to jobs where Career Concerns are provided for.

iPIC↔PIC6) <u>Agent's Level of Risk Aversion & Job Complexity</u>

[N3] **Agents with a high level of risk aversion are less likely to respond positively to complex jobs**: Complex jobs typically have higher skill requirements, less routine, and more uncertainties than less complex jobs. It has been observed that, "some individuals are much more likely to respond positively to an enriched, complex job than are others" (Hackman & Oldham, 1976, p. 252). This in in part due to some agents being more or less comfortable with risks and uncertainties.

iPIC↔PIC7) <u>Agent's Level of Risk Aversion & Performance Measurability</u>

[S1] **The more risk averse an agent is the more holistic performance measures should be**: Holmström & Milgrom (1987, p. 304) observe that optimal contracts respond to information about the agent's action provided by outcomes and reasserts that "when agents are risk averse, optimal contracts will generally depend on all available information about the agent's action."

iPIC↔PIC8) <u>Agent's Level of Risk Aversion & Autonomy</u>

[S3] **Providing risk averse employees with Autonomy that introduces uncertainties have costs**: While providing for Autonomy improves employees' Intrinsic Motivation the effect will be limited or even negative in situations where employees with a high level of risk aversion is exposed to too many uncertainties. Out of the four types of Autonomy identified earlier method Autonomy is expected to provide the most uncertainties.

iPIC↔PIC9) <u>Agent's Level of Risk Aversion & Risk to Agent</u>

[N1] **The higher an employee's levels of risk aversion the higher the costs of exposing the employee to risks**: See the definition and description of Agent's Level of Risk Aversion.

iPIC↔PIC10) <u>Agent's Level of Risk Aversion & Intrinsic Motivation</u>

[S3] **The higher an employee's level of risk aversion the larger the loss of Intrinsic Motivation due to risks to the employee will be**: In line with the link between Agent's Level of Risk Aversion and Risk to Agent and the link between the latter and Intrinsic Motivation the cost of exposing risk averse employees to risks will be magnified.

iPIC↔PIC11) <u>Agent's Level of Risk Aversion & Selection Effects</u>

[S2] **Agent's Level of Risk Aversion will intensify the effect of risk related Selection Effects**: Noting that performance pay introduces uncertainties hence risk, "more risk averse individuals seem to apply for jobs where performance contingent wages are less likely" (Grund & Sliwka, 2010, p. 10).

iPIC↔PIC12) <u>Job Complexity & Performance Measurability</u>

a) [N1] **It is typically more difficult to measure performance in more complex jobs** (Baker, Gibbons, & Murphy, 1994).

b) [S1] **Jobs with high complexity cannot rely on objective measures**: It is found, especially in more complex jobs, that the "worker's contribution to firm value is too complex and subtle to be verified by a third party and so cannot be the basis of an enforceable contract" (Baker, Gibbons, & Murphy, 1994, p. 1129).

iPIC↔PIC13) <u>Job Complexity & Team Production</u>

[S3] **Team Production can allow mutual monitoring to alleviate performance measurement challenges in complex jobs**: The challenge of performance measurement in complex jobs is intensified by employees having superior knowledge (Baker G. P., 1992). In Team Production settings mutual monitoring can alleviate this challenge as the employee's peers are like to possess comparable knowledge.

iPIC↔PIC14) <u>Job Complexity & Autonomy</u>

[P1] **Job Complexity generally increases as Autonomy increases**: It has long been held that "Autonomy serves, at least in part, to summarize the overall complexity of a job" (Hackman & Oldham, 1976, p. 273). Contemporary constructs that seek to measure Job Complexity, such as analysts at United States Department of Labour who developed a dictionary of occupational titles, consider Autonomy, routine, and decisions latitude (Shalley, Gilson, & Blum, 2009).

iPIC↔PIC15) Job Complexity & Perceived Competence

a) [S2] **An employee's Perceived Competence is at risk when the employee's ability does not match the level of Job Complexity**: People seek challenges that are in line with their abilities in order to improve and maintain their skills (Dysvik & Kuvaas, 2010; Mihaly, 2008; Ng, Lonsdale, & Hodge, 2011). An employer needs to design work that is challenging enough but not too complicated for specific employees.

b) [S1] **Employees with a high growth needs strength are more likely to respond positively to complex jobs**: "Employees with high measured needs for growth responded more positively to complex jobs than did employees low in growth need strength" (Hackman & Oldham, 1976, p. 255).

iPIC↔PIC16) Job Complexity & Risk to Agent

[N2] **As Job Complexity increases Risk to Agent typically increase as well**: The more complex a job becomes the more uncertainties arise (consider the required cognitive capacity, reduction in routines, decision latitude, and Data-People-Things). Uncertainties introduce risk, especially with performance related pay where these uncertainties "may disrupt the link between effort investment and future rewards" which inherently increase the associated risk (Lambooij, Flache, & Siegers, 2009, p. 310).

iPIC↔PIC17) Job Complexity & Gaming/Multitasking

[N1] **The opportunities for Gaming/Multitasking increases with Job Complexity**: Two mechanisms drive this phenomena; the difficulty of measuring the performance of complex jobs, and the superior knowledge of employees.

- Measurability: "Agents can 'game' the evaluation procedure to their advantage. This arises because many jobs are complex, in the sense that many aspects of those jobs are hard to contract over. As a result, the use of explicit contracts could cause agents to focus too much on those aspects of the job included in the contract to the detriment of those that are excluded" (Prendergast, 1999, p. 21).
- Superior Knowledge: Complex jobs not only cause measurement issues but also leave agents with superior knowledge; "The reason is that the scientist is able to game the number of patents produced, using his superior knowledge to work too hard on the easy ones and not hard enough on the hard ones" (Baker G. P., 1992, p. 609).

iPIC↔PIC18) Job Complexity & Intrinsic Motivation

[S1] **Employees with high growths need is more likely to be intrinsically motivated in complex jobs:** The phenomena observed by Hackman & Oldham (1976, p. 255) that "employees with high measured needs for growth responded more positively to complex jobs than did employees low in growth need strength" is supported and explained by contemporary authors as follows: "Individuals with high growth need strength will seek out opportunities to grow and act creatively in complex jobs even when they are not encouraged by their work context to perform creatively. In this situation, complexity can substitute for the lack of support by augmenting high growth need strength with job-related opportunities to fulfill growth desires" (Shalley, Gilson, & Blum, 2009, p. 492).

iPIC↔PIC19) Job Complexity & Selection Effects

[P3] **Job Complexity is expected to have a natural sorting effect**: Aside from higher-powered contingent incentives attracting higher-skilled workers there is evidence that workers may also sort "on the basis of their intrinsic preferences for one regime or another – that is, their intrinsic 'fit' with available institutions" (Boudreau & Lakhani, 2011, p. 2).

iPIC↔PIC20) Performance Measurability & Team Production

a) [P1] **Team Production settings allow mutual monitoring**: A common economic argument for team-based incentives is that these policies encourage mutual monitoring (Baker, Jensen, & Murphy, 1988; Prendergast, 1999).

b) [S3] **Team Production settings make it more difficult to measure individual performance**: "Team production problems potentially arise in situations where individual contributions to output cannot be easily identified and compensation must be based on team production" (Prendergast, 1999, p. 39).

c) [S1] **When only group, rather than individual, effort is observable team based incentives are recommended**: "Joint-production situations where only group, and not individual, output is observable, lend themselves to team-based incentive plans" (Baker, Jensen, & Murphy, 1988, p. 39).

iPIC↔PIC21) Performance Measurability & Perceived Fairness

[S3] **When subjective measures are used Perceived Fairness can be negatively affected**: "The essential feature of subjective assessments is that they cannot be verified by outsiders" (Prendergast, 1999, p. 29). Relying solely on subjective measures can thus hamper levels of Perceived Fairness.

iPIC↔PIC22) Performance Measurability & Autonomy

[N2] **As Autonomy increases Performance Measurability becomes more difficult**: "In organisations with a high ambiguity and a low routine, measurement of output is more difficult" (Dooren, 2005, p. 372).

iPIC↔PIC23) Performance Measurability & Risk to Agent

a) [N3] **Challenges with performance measures can increases the risk to employees**: Uncertainties with performance measures or a heavy reliance on subjective measures can impose risk on employees. Uncertainties introduce risk, especially with performance related pay where these uncertainties "may disrupt the link between effort investment and future rewards" which inherently increase the associated risk (Lambooij, Flache, & Siegers, 2009, p. 310). Subjective measures impose a risk on employee as firm may renege on rewards or underrate performance (this is closely related to trust under Perceived Fairness).

b) [S2] **Explicit measures can increase the risk to employees**: "Since explicit measures are affected by factors outside the employee's control, they impose risk on the employee" (Gibbs, Merchant, Van Der Stede, & Vargus, 2009, p. 237).

iPIC↔PIC24) Performance Measurability & Gaming/Multitasking

[N1] **As it becomes more difficult to holistically and accurately measure performance the opportunities for gaming increases**: Gaming or multitasking occurs "because contracts often cannot rely upon a holistic measure of the worker's contribution at every moment in time" allowing employees to "game the compensation system" (Prendergast, 1999, p. 8). Using subjective, as opposed to objective, measure does not completely solve this problem as employee can still manipulate the 'measurements' by currying favour instead of optimising performance (Prendergast, 1999).

iPIC↔PIC25) Team Production & Autonomy

[S2] **In settings with high levels of Task Interdependence Autonomy can create opportunities for Team Production**: "When task interdependence is high there will be a strong need for team members to help one another and to mutually adjust efforts but, if at the same time the level of perceived task Autonomy is low, there will be few opportunities to do so" (Molleman, 2009, p. 248).

iPIC↔PIC26) Team Production & Relatedness/Purpose

[P3] **Team Production settings, especially with a high degree of Task Interdependence, typically enhances relatedness**: Employees who do not interact regularly with other employees are less likely to from bonds that facilitates a sense of belonging or relatedness. Team Production settings, especially where a high degree of Task Interdependence exists, is expected to increase the incidence of employees who experience a sense of belonging or relatedness.

iPIC↔PIC27) Team Production & Risk to Agent

[N2] **Team Production settings impose additional risk on employees**: In Team Production settings measures of an employee's success depends not only on the actions of the employee but on that of the employee's team members as well. External factors outside the employee's control thus have a bearing on the employee's success, and it is accepted that "factors outside the employee's control, they impose risk on the employee" (Gibbs, Merchant, Van Der Stede, & Vargus, 2009, p. 237).

iPIC↔PIC28) Team Production & Gaming/Multitasking

[N1] **Team Production settings increases the opportunities for Gaming/Multitasking**: Performance measurement for individuals especially become more difficult in team settings, it follows that "there is considerable evidence of free riding in teams" (Prendergast, 1999, p. 9). Free riding or social loafing is a reduction in motivation and effort when individuals work collectively and receives much attention in the literature (Karau & Williams, 1995; Garbers & Konradt, 2014; Barnes, Hollenbeck, Jundt, DeRue, & Harmon, 2010).

iPIC↔PIC29) Team Production & Intrinsic Motivating

[P1] **Team Production settings are expected to have a positive effect on internal motivation**: Noting the link between Team Production and Relatedness/Purpose and the link between the latter and Intrinsic Motivation is flows that Team Production will typically have a positive influence on Intrinsic Motivation. This is noted by Hackman & Oldham (1976, p. 277): "people ... experience greater internal motivation when they are satisfied with on-the-job relationships than when they are dissatisfied with these relationships."

iPIC↔PIC30) Team Production & Selection Effects

[N2] **Team Production can lead to adverse Selection Effects**: "Low-ability workers could expect that teaming up with higher-ability workers would raise their pay. However, since high-ability workers would think the opposite way, this creates an adverse selection problem" (Hamilton, Nickerson, & Owan, 2003, p. 467).

iPIC↔PIC31) Perceived Fairness & Relatedness/Purpose

[P2] **Perceived Fairness improves employees' sense of relatedness**: An employee's sense of relatedness or belonging, especially with regard to the organisation, is improved if the employee has a perception of being treated fairly. "Employees come to understand their relationship to organizations and organizational authorities in terms of social exchange when they experience procedural fairness in their treatment, because this communicates to them that they are valued and cared for" (Kamdar, McAllister, & Turban, 2006, p. 843).

iPIC↔PIC32) Perceived Fairness & Gaming/Multitasking

[S1] **When transparency is used to improve Perceived Fairness opportunities for gaming typically increase**: Transparency affects an agent's perception of fairness (Gagne & Deci, 2005, p. 354) yet high levels of transparency, especially in situation where the agent has superior information, often leads to dysfunctional behavioural responses. It is suggested that limiting transparency can help deter gaming, this reasoning is extensive dating back to at least Bentham in 1830 (Ederer, Holden, & Meyer, 2013). As a result there is a trade-off between being transparent and withholding some information (Jehiel, 2015).

iPIC↔PIC33) Perceived Fairness & Intrinsic Motivation

[P2] **Intrinsic Motivation should improve with Perceived Fairness**: There is a strong link between citizenship behaviours and Intrinsic Motivation: "In sum, we have a generous fund of empirical support for the importance of Perceived Fairness in determining the full extent of cooperative contributions to organizations, particularly those contributions comprising what we have come to call citizenship behaviors" (Organ & Moorman, 1993, p. 16).

iPIC↔PIC34) Autonomy & Perceived Competence

[P1] **Increased Autonomy is expected to result in increased Perceived Competence**: Not feeling 'controlled' is expected to increase an employee's perception of the employee's own levels of competence. There is wide support for the hypothesis that "increases in Perceived Competence must be accompanied by a sense of Autonomy in order for the enhanced feelings of competence to result in increased intrinsic motivation" (Ryan & Deci, 2000a, p. 59).

iPIC↔PIC35) Autonomy & Relatedness/Purpose

[P3] **Increased levels of Autonomy is expected to support Relatedness/Purpose**: Employees who have more Autonomy, especially when coupled with a high degree of Task Interdependence, have more opportunities to interact with colleagues and develop a sense of belonging or relatedness.

iPIC↔PIC36) Autonomy & Risk to Agent

[N3] **Increased levels of Autonomy exposes employees to more risks**: Autonomy provides freedom in areas such as procedures/methods, scheduling/sequencing/timing, criteria, and even team selection. This introduces certain uncertainties. Uncertainties introduce risk, especially with performance related pay where these uncertainties "may disrupt the link between effort investment and future rewards" which inherently increase the associated risk (Lambooij, Flache, & Siegers, 2009, p. 310).

iPIC↔PIC37) Autonomy & Gaming/Multitasking

[N2] **Increasing Autonomy increases the scope for Gaming/Multitasking**: As Autonomy increases the following situation is approached; "In organisations with a high ambiguity and a low routine, measurement of output is more difficult" (Dooren, 2005, p. 372). As measurability declines the scope for Gaming/Multitasking increases. This has led to the observation; "Whether workers make effective use of Autonomy may depend on individual motivational states" (Heidemeier & Wiese, 2014, p. 18).

iPIC↔PIC38) Autonomy & Intrinsic Motivation

[P1] **Increasing Autonomy increases Intrinsic Motivation**: Work from behavioural scientists are adamant that there is a strong link between Autonomy and Intrinsic Motivation (Gagne & Deci, 2005; Ryan & Deci, 2000b).

iPIC↔PIC39) Autonomy & Selection Effects

[PR3] **Autonomy is expected to have a natural sorting effect**: Aside from higher-powered contingent incentives attracting higher-skilled workers there is evidence that workers may also sort "on the basis of their intrinsic preferences for one regime or another – that is, their intrinsic 'fit' with available institutions" (Boudreau & Lakhani, 2011, p. 2). It follows that some individuals will seek employment where a certain level of Autonomy is provided.

iPIC↔PIC40) Perceived Competence & Intrinsic Motivation

[P1] **Perceived Competence increases Intrinsic Motivation**: Work from behavioural scientists are adamant that there is a strong link between Perceived Competence and Intrinsic Motivation (Gagne & Deci, 2005; Ryan & Deci, 2000b). "Where rewards are positively informational, they are predicted to provide satisfaction of the need for competence and thus to enhance intrinsic motivation" (Deci, Koestner, & Ryan, 1999).

iPIC↔PIC41) Relatedness/Purpose & Intrinsic Motivation

[P1] **Relatedness/Purpose increases Intrinsic Motivation**: Relatedness/Purpose is one of the key drivers of Intrinsic Motivation (Latham & Pinder, 2005; Pink, 2009; Ryan & Deci, 2000b).

iPIC↔PIC42) Risk to Agent & Intrinsic Motivation

[N1] **Risk to Agent is expected to decrease Intrinsic Motivation**: Risk inherently conduce toward an external perceived locus of causality or an external locus of control; the individual is not (or more precisely, does not perceive himself/herself to be) in control of factors that affect him/her. This leads to diminished Intrinsic Motivation: "research revealed that… diminish intrinsic motivation because… they conduce toward an external perceived locus of causality" (Ryan & Deci, 2000b, p. 70).

iPIC↔PIC43) Risk to Agent & Selection Effects

[P2] **Increasing the risk to employees will intensify the Selection Effects**: "The particular institutional details of incentive schemes will attract different kinds of workers and generate sorting, thereby affecting the composition of the workforce" (Boudreau & Lakhani, 2011, p. 2). This holds with risks especially as seen in the link between Agent's Level of Risk Aversion and Selection Effects.

iPIC↔PIC44) Gaming/Multitasking & Intrinsic Motivation

[P1] **Intrinsic Motivation is expected to decrease the incidence of Gaming/Multitasking**: Issues such as detachment and disengagement could at least be partially remedied through higher levels of Intrinsic Motivation (Deci, Koestner, & Ryan, 1999).

Appendix C.2 – The Initial Links between PICs and FIMs (The iFIM→PIC Links)

The following list contains the initial links that were identified between the Features of Incentive Mechanisms (FIMs) and the 13 PICs. While this list is the basis that the final list stems from many refinements and updates were necessary.

The format for each item is as follows:
[Link number)] [(Number and name of Feature of Incentive Mechanism) & (PIC) that is linked]
[Type of Link] **Summary of the link's effect**: Additional Information.

Key:

- Link Effect - The FIMs and PICs do not all affect each other in the same manner. The relationships are:
    - [P] Positive – Common opportunities or positive effects in relation to the liked PIC.
    - [N] Negative – Common dangers, threats, or negative effects in related to the linked PIC.
    - [I] Informative – A situation where FIMs are typically used in a certain manner.

iFIM→PIC1) Objective Performance Measures (FIM1.1) & Perceived Fairness (PIC6)
[P] **The use of objective performance measures typically improves Perceived Fairness:** Objective measures are not prone to fairness or reneging concerns and can be verified for contractual purposes. Two of the factors affecting Perceived Fairness is transparency and trust. With objective performance measures there is no subjectivity. Trust issues are thus minimised and high levels of transparency can be facilitated.

iFIM→PIC2) Objective Performance Measures (FIM1.1) & Performance Measurability (PIC4)
[I] **Good Performance Measurability enable the use of objective performance measures:** Objective measures are dependent on the availability and comprehensiveness of quantitative indicators. As an example "complex jobs [as per link PIC↔PIC12] will typically not be evaluated through explicit contracts" (Prendergast, 1999, p. 9).

iFIM→PIC3) Objective Performance Measures (FIM1.1) & Gaming/Multitasking (PIC11)

[N] **Objective performance measures are vulnerable to Gaming/Multitasking:** When objective performance measures are used there is a danger of "resourceful employees 'gaming the system' by optimizing with respect to actual instead of intended measures" (Baker, Jensen, & Murphy, 1988, p. 597) or of employees focusing "too much on those aspects of the job included in the contract to the detriment of those that are excluded" (Prendergast, 1999, p. 21). Note that this effect is regulated by link iFIM→PIC2. Specific issues that should be accounted for include (Ederer, Holden, & Meyer, 2013, p. 1):

- Effort Diversion: "Diversion of effort away from activities that are socially valuable but difficult to measure and reward, towards activities that are easily measured and rewarded."
- Exploitation of Classification Rules: "Exploitation of the rules of classification to improve apparent, though not actual, performance."
- Timing Distortions: "Distortion of choices about timing and/or pricing to exploit temporarily high monetary rewards even when socially efficient choices have not changed."

iFIM→PIC4) Objective Performance Measures (FIM1.1) & Risk to Agent (PIC10)

[N] **Objective performance measures increase Risk to Agent, especially common risks:** Objective measures struggle to account for common risks. "Government policies, economic climate, competitor actions, technological change, and so on, may cause uncontrollable variations in outcomes" (Eisenhardt, 1989, p. 61). "Since explicit measures are affected by factors outside the employee's control, they impose risk on the employee" (Gibbs, Merchant, Van Der Stede, & Vargus, 2009, p. 237).

iFIM→PIC5) Subjective Performance Measures (FIM1.2) & Perceived Fairness

[N] **The use of subjective performance measures typically harms Perceived Fairness:** Subjective measures are prone to fairness or reneging concerns and cannot be verified for contractual purposes. Two of the factors affecting Perceived Fairness is transparency and trust. With subjective performance measures high levels of transparency cannot be facilitated. Issues like reneging, cognitive biases during evaluation, and underreporting will be a concern to employees.

iFIM→PIC6) Subjective Performance Measures (FIM1.2) & Performance Measures (PIC4)

[I] **Poor Performance Measurability advocates the use of subjective performance measures:** In the absence of comprehensive quantitative indicators subjective measures can be used. As an example "complex jobs [as per link PIC↔PIC12] will typically not be evaluated through explicit contracts" (Prendergast, 1999, p. 9).

iFIM→PIC7) <u>Subjective Performance Measures (FIM1.2) & Gaming/Multitasking (PIC11)</u>

[P] **Subjective performance measures are less susceptible to gaming, but not immune:** "Subjective assessments have the benefit that they can be a more fully rounded measure of performance" (Prendergast, 1999, p. 9) making IMs that use them harder to game. Using subjective, as opposed to objective, measures does not completely solve this problem however as employee can still manipulate the 'measurements' by currying favour instead of optimising performance (Prendergast, 1999). In such situations employees can "pursue advancement through image management, social relationships, and personal manipulation rather than by means of effective performance" (Orpen, 1998, p. 128).

iFIM→PIC8) <u>Subjective Performance Measures (FIM1.2) & Risk to Agent (PIC10)</u>

[N] **Subjective performance measures increase Risk to Agent, especially trust related risks:** Subjective measures impose a risk on employee as firm may renege on rewards or underrate performance (this is closely related to trust under Perceived Fairness).

iFIM→PIC9) <u>A Combination of Objective and Subjective Measures (FIM1.3) & PICs</u>

[P&N] **A mixture of the links between objective and subjective measures with the PICs:** As both objective and subjective measures have certain strengths and weaknesses it is found that "many firms mitigate the effects of distortionary objective performance measures by augmenting objective measures with subjective assessments of performance" (Baker, Gibbons, & Murphy, 1994, p. 1126). A balance of the effects from the respective links are thus expected:

- Linked with Perceived Fairness through link iFIM→PIC1 and iFIM→PIC4.
- Linked with Performance Measurability through link iFIM→PIC2 and iFIM→PIC6.
- Linked with Gaming/Multitasking through link iFIM→PIC3 and iFIM→PIC7.
- Linked with Risk to Agent through link iFIM→PIC4 and iFIM→PIC8.

iFIM→PIC10) <u>Tournaments or Relative Performance (FIM2.1) & Performance Measurability (PIC4)</u>

[I] **Tournaments are typically used when it is easier to measure relative than absolute performance:** "Tournaments may be the socially efficient arrangement if rank is easier to observe than is individual performance" (Lazear & Rosen, 1981, p. 861).

iFIM→PIC11) <u>Tournaments or Relative Performance (FIM2.1) + Team Production (PIC5) → Gaming/Multitasking (PIC11)</u>

[N+] **Tournaments can lead to employees not helping their competitors, this results in difficulties in Team Production scenarios:** "A problem with tournaments is that since individuals are evaluated on how well they do relative to others, they are unlikely to help their competitors in need" (Prendergast, 1999, p. 35).

iFIM→PIC12) <u>Tournaments or Relative Performance (FIM2.1) & Agent's Level of Risk Aversion (PIC2)</u>

[I] **Less risk averse employees are more likely to prefer tournaments (or Piece Rates):** "The likelihood that subjects prefer the piece rate or the tournament is higher the less risk averse they are" (Dohmen & Falk, 2011, p. 557).

iFIM→PIC13) <u>Tournaments or Relative Performance (FIM2.1) & Selection Effects (PIC13)</u>
[P] **Tournaments and other variable pay schemes typically attract productive workers:** "Productive workers are more likely to self-select into variable-payment schemes", "the effect is strongest in the most competitive scheme, the tournament" (Dohmen & Falk, 2011, p. 583).

iFIM→PIC14) <u>Tournaments or Relative Performance (FIM2.1) & Perceived Fairness (PIC6)</u>
[N] **Competitive incentives may have a negative effect on Perceived Fairness:** "People may perceive competitive incentives as less fair than piece-rate or quota plans" (Stolovich, 2010, p. 4).

iFIM→PIC15) <u>Linear Schemes (FIM2.2) & Perceived Fairness (PIC6)</u>
[P] **Linear incentive plans can typically be designed in such a way that they seem fair:** "Such [linear] schemes are often used in practice for their simplicity and relative robustness against manipulation" (Dixit, 2002, p. 698).

iFIM→PIC16) <u>Linear Schemes (FIM2.2) & Gaming/Multitasking (PIC11)</u>
[P] **Linear incentive plans are typically hard to manipulate because of their simplicity:** "Such [linear] schemes are often used in practice for their simplicity and relative robustness against manipulation" (Dixit, 2002, p. 698).

iFIM→PIC17) <u>Non-linear Schemes (FIM2.3) & Gaming/Multitasking (PIC11)</u>
[N] **Non-linear incentive plans introduce a variety of opportunities for Gaming/Multitasking:** The step function nature of non-linear schemes allow them to be gamed in various ways, some examples include:

- Waiting until the last minute for discounting reasons.
- Slacking after reaching the target or if reaching it becomes improbable.
- Manipulating the timing of events to fall in the current or next period.

iFIM→PIC18) <u>A Combination of Linear and Non-linear Schemes (FIM2.4) & PICs</u>
[P&N] **A mixture of the links between linear and non-linear schemes with the PICs:** "In practice we often see a combination, where the payment schedule has a break at a threshold level, and linear rewards or penalties on either side of it. Such a scheme combines the merits and drawbacks of the two pure types" (Dixit, 2002, p. 700).

iFIM→PIC19) <u>Linear Schemes (FIM2.2) & Agent's Level or Risk Aversion (PIC2)</u>
[I] **More risk averse employees would prefer linear to non-linear incentive plans:** As the level of risk associated with non-linear incentive are is higher than that associated with linear incentive plans risk averse employee are expected to prefer linear incentive plans.

iFIM→PIC20) <u>Non-linear Schemes (FIM2.3) & Risk to Agent (PIC10)</u>
[N] **Non-linear incentive plans introduces more risk to the agent than linear ones**: The step function nature of non-linear incentive plans puts the agent at a larger risk of not receiving a reward for effort exerted than linear incentive plans.

iFIM→PIC21) <u>Intangible Rewards (FIM3.1) & Autonomy (PIC7)</u>
[P] **Employees can be granted more Autonomy as an intangible reward:** The extrinsic reward IM6 naturally result in increased levels of Autonomy.

iFIM→PIC22) <u>Intangible Rewards (FIM3.1) & Perceived Competence (PIC8)</u>
[P] **Recognition can be used as an intangible reward to increase Perceived Competence:** The extrinsic reward IM5 typically results in increased levels of Perceived Competence.

iFIM→PIC23) <u>Tangible Rewards (FIM3.2) & Intrinsic Motivation (PIC12)</u>
[N] **Extrinsic rewards, especially tangible rewards, can decrease Intrinsic Motivation:** It is to be acknowledged that there is evidence that strong monetary rewards (extrinsic, typically tangible) can have a crowding-out effect on Intrinsic Motivation (Gagne & Deci, 2005). This phenomenon, with its roots in behavioural science or psychology, is complex but centres around the idea that extrinsic motivators can be so powerful that they crowd out the drivers for Intrinsic Motivation. Determining thresholds is not possible, yet being aware of this should help users to gain a somewhat better understanding of the multifaceted challenge of human motivation.

iFIM→PIC24) <u>A Combination of Tangible and Intangible Incentives (FIM3.3) & PICs</u>
[P&N] **A mixture of the links between tangible and intangible incentives with the PICs:** Both tangible and intangible incentives have strengths and weaknesses. Many nuanced combinations of tangible and intangible incentives can be used.

iFIM→PIC25) <u>Team Based Incentives (FIM4.2) & Gaming/Multitasking (PIC11)</u>
a) [N] **Using team based incentives increases the danger of the free-rider problem:** Team based systems are suspect to the free-rider or 1/n problem (Baker, Jensen, & Murphy, 1988; FitzRoy & Kraft, 1995; Prendergast, 1999). Free riding or social loafing is a reduction in motivation and effort when individuals work collectively and receives much attention in the literature (Karau & Williams, 1995; Garbers & Konradt, 2014; Barnes, Hollenbeck, Jundt, DeRue, & Harmon, 2010).
b) [N] **Team based incentives tends to flatten productivity:** Moving to team based systems "Improves the performance of those who were less productive on individual schemes but decreases that of the more productive" (Prendergast, 1999, p. 41).

iFIM→PIC26) <u>Individual Incentives (FIM4.1) & Gaming/Multitasking (PIC11)</u>
[N] **Individual incentives does not stimulate cooperation as well as team based incentives:** Team based systems stimulates cooperation (FitzRoy & Kraft, 1995; Holmström & Milgrom, 1991; Prendergast, 1999).

iFIM→PIC27) Team Based Incentives (FIM4.2) & Performance Measurability (PIC4)
[P] **Team based incentives encourages mutual monitoring:** With team based systems employees have an incentive to monitor each other and exert positive peer pressure (Baker, Jensen, & Murphy, 1988; FitzRoy & Kraft, 1995; Prendergast, 1999). This is especially useful in situations where it is hard to measure the performance of individuals.

iFIM→PIC28) Individual Incentives (FIM4.1) & Performance Measurability (PIC4)
[N] **It can be harder to measure individual performance:** Often team based performance measures are more accurate (Breaugh J. A., 1999) while "individual contributions to output cannot be easily identified" (Prendergast, 1999, p. 39).

iFIM→PIC29) Individual Incentives (FIM4.1) & Selection Effects (PIC13)
[P] **Individual incentives are expected to attract higher performing employees:** Incentive pay thus affects the supply of workers, namely when workers or managers are offered incentive pay, they self-select into jobs where they expect their compensation to be higher (Bandiera, Barankay, & Rasul, 2007). "This means that group-based pay may also have unfavorable sorting effects, causing the highest performers to choose alternative opportunities where individual results will be rewarded more heavily" (Rynes, Gerhart, & Parks, 2005, p. 585).

iFIM→PIC30) A Combination of Individual and Team Based Incentives (FIM4.3) & PICs
[P&N] **A mixture of the links between individual and team based incentives with the PICs:** Both individual and team based incentives have strengths and weaknesses. Many nuanced combinations of them can be used.

iFIM→PIC31) Linear Schemes (FIM2.2) & Performance Measurability (PIC4)
[I] **Linear schemes, especially Piece Rates, work best in simple jobs:** Piece Rates work best in situations where "workers carry out simple jobs, in the sense that aggregate measures of performance are available" (Prendergast, 1999, p. 17).

Appendix D – Textual or Coded Tables Accompanying Visual Models

The tables in this appendix (Table D-1, Table D-2, and Table D-3) use an alternative numbering system for the links to improve the readability of the tables. The numbering system is as follows:

- **PIC↔PIC Links** are referred to as ‘**B**’ links (links between the PICs themselves).
- **IM→PIC Links** are referred to as ‘**M**’ links (links between the PICs and IMs).
- **IM–FIM Links** are referred to as ‘**I**’ links (links between the IMs and FIMs).
- **FIM→PIC Links** are referred to as ‘**F**’ links (links between the PICs and FIMs).
- **EJD→IM Links** are referred to as ‘**D**’ links (links between the IMs and EJD).
- **EJD→PIC Links** are referred to as ‘**J**’ links (links between the PICs and EJD).

Appendix D.1 – Comprehensive Table for Link Model PIC↔PIC

The information visually represented in Figure 9-10 is summarised on Table D-1 in Chapter 9.4 Table D-1 compiles the links that affect, and is affected by, a specific PIC. Like Figure 9-10, it is to be used in conjunction with the description of the links in Appendix B.1.

Table D-1: A summary of the links between PICs (refer to the start of Appendix D for numbering system)

PICs	PIC	Influenced by	Influences
Syntax*→	#	(Type of Link)(linked with PIC#) / (Link#) [(Effect)(Relationship)(Source)]	
Career Concerns	1	D2/B1a[NR2], D2/B1b[NC3], D4/B2[PC1]	D6/B3[NR2], D10/B4[NR2], D13/B5[PR3]
Agent's Level of Risk Aversion	2		D1/B1a[NR2], D1/B1b[NC3], D3/B6[NR3], D4/B7[NC1], D7/B8[NC3], D10/B9[NR1], C(10→12)/B10[NR1,NR3], C(10→13)/B11[PR2,PR3]
Job Complexity	3	D2/B6[NR3], D7/B13[NR1]	D4/B12a[NR1], D4/B12b[NC1], D8/B14[NC2], D10/B15[NR2], S11/B16[NR1], D12/B17[PC1], D13/B18[PR3]
Performance Measurability	4	D2/B7[NC1], D3/B12a[NR1], D3/B12b[NC1], D5/B19a[PC1], D5/B19b[NC1], S7/B21[NR2]	D1/B2[PC1], D6/B20[NC3], D10/B22[NR3], D11/B23[NR1]
Team Production	5	D7/B24[PC2]	D4/B19a[PC1], D4/B19b[NC1], D9/B25[PR3], D10/B26[NR2], S11/B27[NR1], S12/B28[PR1], D13/B29[NR2]
Perceived Fairness	6	D1/B3[NR2], D4/B20[NC3]	D9/B30[PR2], D11/B31[NC1], D12/B32[PR2]
Autonomy	7	D2/B8[NC3]	D3/B13[NR1], S4/B21[NR2], D5/B24[PC2], D8/B33[PR1], S9/B34[PR3], D10/B35[NR3], S11/B36[NR2], D12/B37[PR1], D13/B38[PR3]
Perceived Competence	8	D3/B14[NC2], D7/B33[PR1]	D12/B38[PR1]
Relatedness / Purpose	9	D5/B25[PR3], D6/B30[PR2], S7/B34[PR3]	D12/B39[PR1]
Risk to Agent	10	D1/B4[NR2], D2/B9[NR1], D3/B15[NR2], D4/B22[NR3], D5/B26[NR2], D7/B35[NR3]	C(2→12)/B10[NR1,NR3], C(2→13)/B11[PR2,PR3]
Gaming / Multitasking	11	S3/B16[NR1], D4/B23[NR1], S5/B27[NR1], D6/B31[NC1], S7/B36[NR2], D12/B41[PR1]	
Intrinsic Motivation	12	D3/B17[PC1], S5/B28[PR1], D6/B32[PR2], D7/B37[PR1], D8/B39[PR1], D9/B40[PR1], C(2+10)/B10[NR1,NR3]	D11/B40[PR1]
Selection Effects	13	D1/B5[PR3], D3/B18[PR3], D5/B29[NR2], D7/B38[PR3], C(2+10)/B11[PR2,PR2]	

Key*	
Type of Link	D = Direct or 1st-degree, S = 2nd-degree, C = Compound
Link Relationship	R = Directly Related, C = Conditionally Related
Link Effect	P = Positively related, N = Negatively related
Link Source	1 = KIWs, 2 = Alternative literature, 3 = Author's discernment

Appendix D.2 – Comprehensive Table for FIM→PIC Links and IM→PIC Links

Table D-2 contains a summary of the information on the right hand side of Figure 10-6 in Chapter 10.5.2. This is shown in conjunction with the links between PICs and Features of Incentive Mechanisms (FIMs) as shown in Figure 10-5 in Chapter 10.3. Combining this data allows a user to easily ascertain what considerations are related to a specific PIC. Definitions can be found in Chapter 10.5.

Table D-2: A summary of the connections between the 13 PICs, and the connections between the IMs and FIMs (refer to the start of Appendix D for numbering system)

Links with FIMs	PICs	Links with IMs
(FIM#)([Link#])-(Link Effect)	←Syntax*→	(IM#)([Link#])-(Link Effect)/(Link Type)
3[F18]-I	1: Career Concerns	4.3[M34]-I/C, 7[M50]-I/C
2[F12]-I	2: Agent's Level of Risk Aversion	7[M51]-I/C
	3: Job Complexity	
1[F1]-I, 2[F8]-I, 3[F10]-I, 4[F21]-I	4: Performance Measurability	1[M1]-I/C, 2[M9]-I/C, 3[M16]-I/C, 4.2[M30]-I/C, 5.1[M40]-I/C
2.1[F11]-N, 4[F23]-I	5: Team Production	1[M2]-I/C, 2[M10]-I/C, 7[M52]-N/G
1[F2]-G, 2[F3]-G, 2.1[F14]-N	6: Perceived Fairness	1[M3]-P/G, 2.1&2.2[M12]-P/G, 3[M17]-P/G, 4.1[M27]-N/G, 4.3[M35]-N/C, 5[M36]-I/C, 6[M44]-N/G, 7[M53]-N/G
3[F15]-P	7: Autonomy	6[M45]-P/C
2[F9]-N, 3[F16]-P	8: Perceived Competence	4.2[M31]-P/C, 5.1[M41]-P/C, 7[M54]-N/G
	9: Relatedness / Purpose	2.1[M11]-P/C, 5[M37]-P/C
1[F3]-G&N, 2[F7]-G	10: Risk to Agent	1[M4]-P/N&G/C, 2.1&2.2[M13]-N/G, 3[M18]-P&N/G, 3.1[M20]-P/C, 3.2[M22]-N/C, 3.3[M23]-N/C, 5[M38]-N/G, 5.1[M42]-P/C, 6[M46]-N/G, 7.1[M58]-N/C
1[F4]-G, 2[F5]-G, 2.1[F11]-N, 4[F20]-G	11: Gaming / Multitasking	1[M5]-P/N&G/C, 2.1&2.2[M14]-P&N/G, 3[M19]-P&N/C, 3.1[M21]-N/C, 3.3[M24]-P/C, 4[M25]-P&N/G, 4.1[M28]-N/G, 4.2[M32]-P/C, 5[M39]-N/C, 6[M47]-N/G, 7[M55]-P&N/C&G
3[F17]-G	12: Intrinsic Motivation	1[M6]-N/G, 2[M8]-N/G, 4[M26]-N/G, 5.1[M43]-P/C, 6[M48]-P/C, 7[M56]-P/G, 7.1[M59]-N/C
2.1[F13]-P, 3[F19]-P, 1[F22]-G	13: Selection Effects	1[M7]-P/C, 2.1&2.2[M15]-N/G, 4.1[M29]-P/G, 4.2[M33]-P/C, 6[M49]-P/C, 7[M57]-P&N/C
***Key**		
Link Effect	I = Informative, P = Positive, N = Negative, G = Governing	
Link Type	C = Characteristic, G = Generic	

Appendix D.3 – Comprehensive Table for First and Second-Degree Links between EJD-PICs

Table D-3 shows the links illustrated in Figure 11-3 in Chapter 11.3 in text or coded form.

Table D-3: A summary of the 1st- and 2nd-degree connections between the Elements of Job Design and the 13 PICs (refer to the start of Appendix D for numbering system)

PICs	PIC	Primary Links	2nd Degree links
	#	Element[Link#]	Element[Link Series]
Career Concerns	1		E3[B2*+J3]
Agent's Level of Risk Aversion	2		
Job Complexity	3	E5[J6], E6[J7], E7[J8], E8[J9], E9[J11], E10[J12], E18[J21]	E1[B13+J1], E8[B13*+J10], E10[B13*+J13], E20[B13*+J23]
Performance Measurability	4	E3[J3]	E1[B21+J1], E5[B12+J6], E6[B12+J7], E7[B12*+J8], E8[B12*+J9], E8[B21*+J10], E9[B12*+J11], E10[B12*+J12], E10[B21*+J13], E12[B19+J15], E18[B12*+J21], E20[B21*+J23]
Team Production	5	E12[J15]	E1[B24+J1], E8[B24*+J10], E10[B24*+J13], E20[B24*+J23]
Perceived Fairness	6		E3[B20*+J3]
Autonomy	7	E1[J1], E8[J10], E11[J13], E20[J23]	
Perceived Competence	8	E3[J4], E13[J16], E20[J24]	E1[B33+J1], E5[B14*+J6], E6[B14+J7], E7[B14*+J8], E8[B14*+J9], E8[B33*+J10], E9[B14*+J11], E10[B14*+J12], E10[B33*+J13], E18[B14*+J21], E20[B33*+J23]
Relatedness / Purpose	9	E2[J2], E4[J5], E11[J14], E13[J17], E14[J18], E22[J25]	E1[B34+J1], E8[B34*+J10], E10[B34*+J13], E12[B25+J15], E20[B34*+J23]
Risk to Agent	10	E15[J19]	E1[B35+J1], E3[B22+J3], E5[B15*+J6], E6[B15+J7], E7[B15*+J8], E8[B15+J9], E8[B35+J10], E9[B15*+J11], E10[B15*+J12], E10[B35*+J13], E12[B26*+J15], E18[B15*+J21], E20[B35*+J23]
Gaming / Multitasking	11		E1[B36+J1], E3[B23*+J3], E5[B16*+J6], E6[B16+J7], E7[B16*+J8], E8[B16*+J9], E8[B36*+J10], E9[B16*+J11], E10[B16*+J12], E10[B36*+J13], E12[B27*+J15], E16[B40*+J20], E18[B16*+J21], E19[B40*+J22], E20[B36*+J23]
Intrinsic Motivation	12	E16[J20], E19[J22]	E1[B37+J1], E2[B39+J2], E3[B38+J4], E4[B39+J5], E5[B17+J6], E6[B17+J7], E7[B17+J8], E8[B17+J9], E8[B37+J10], E9[B17+J11], E9[B17*+J11], E10[B17+J12], E10[B17*+J12], E10[B37+J13], E11[B39+J14], E12[B28+J15], E13[B38+J16], E13[B39+J17], E14[B39+J18], E15[B11+J19], E18[B17*+J21], E20[B37*+J23], E20[B38*+J24], E22[B39+J25]
Selection Effects	13		E5[B18*+J6], E6[B18+J7], E7[B18*+J8], E8[B18*+J9], E9[B18*+J11], E10[B18*+J12], E12[B29*+J15], E15[B10*+J19], E18[B18*+J21]
*Not directly discussed in Job Design definitions. Derived from links between PICs.			

Appendix E – "Rudimentary DSS User Interface – Information Catalogue" Index

This appendix contains the index for the "Rudimentary DSS User Interface – Information Catalogue". "The Rudimentary DSS User Interface – Information Catalogue" is a standalone document that collates the required information to make use of the DSS into one place. It is not included in the dissertation as no new information is presented. The index that follows provides the reader with a sufficient overview of what information is included in "The Rudimentary DSS User Interface – Information Catalogue".

Index

*The page numbers do not refer to this document, but to a version of the "The Rudimentary DSS User Interface – Information Catalogue".

Appendix F – Demonstration: Hypothetical Illustrative Case Studies

This appendix contains the two Hypothetical Illustrative Case Studies (HICS) as introduced and discussed in Chapter 17. The HICS provides a collection of illustrations that helps users to understand how the DSS can be used in a customised fashion to improve decision-making is various ways.

Each HICS is structured as follows:

- The background for the HICS is sketched.
- An extensive narrative is presented.
- A brief review is provided.

The narrative in HICS1 is numbered as follows:

- 1A1 to 1A4
- 1B1
- 1C1
- 1D1 to 1D4
- 1E1 to 1E4

Refer to Figure 17-1, in Appendix F.1.2 or Chapter 17.3.2, for an overview.

The narrative in HICS2 is numbered as follows:

- 2A1 to 2A2
- 2B1 to 2B4
- 2C1 to 2C3
- 2D1

Refer to Figure 17-2, in Appendix F.2.2 or Chapter 17.4.2, for an overview.

Appendix F.1 – Hypothetical Illustrative Case Study 1 (HICS1)

This appendix contains the first Hypothetical Illustrative Case Study (HICS1 as discussed in Chapter 17.3); an overview of the characteristics and background is followed by an extensive narrative, and summarised in a review.

Appendix F.1.1) Characteristics and Background – HICS1

The parameters for HICS1 is as follows:

- User – Owner/Engineering Manager.
- Target Audience – Skilled labour (artisans in a workshop).
- Industry – Manufacturing (small-scale).
- Status Quo of Practices – No formal plan aside from an ad hoc 13th cheque.
- Objective – Increase artisans' level of engagement.

This HICS considers a hypothetical company called SCEW. SCEW is a small engineering works company that designs, builds, and services pressure vessels. Operations are based in a mechanical workshop in an industrial area on the outskirts of a large city. The workshop is manned by a dozen artisans, each with an assistant. Ms Pricilla Vessel, the owner, serves as the engineering manager on site. She is supported by three draftsmen and two administrative staff.

In terms of practices regarding employee incentives no formal plan is in place, aside from a practice of paying employees a '13th cheque' at the end of the year 'if the company performs well'.

Ms P. Vessel is concerned about a low level of overall employee engagement. She recognises that there is considerable potential for increased performance, especially since there is no shortage of work. The premises does however not allow increasing the workforce, and the company is not able to afford a new, larger, premises. While the level of engagement could be improved for all employees, the artisans are her main concern.

Appendix F.1.2) Narrative – HICS1

An overview of the flow of the narrative for SCEW is depicted in Figure 17-1:

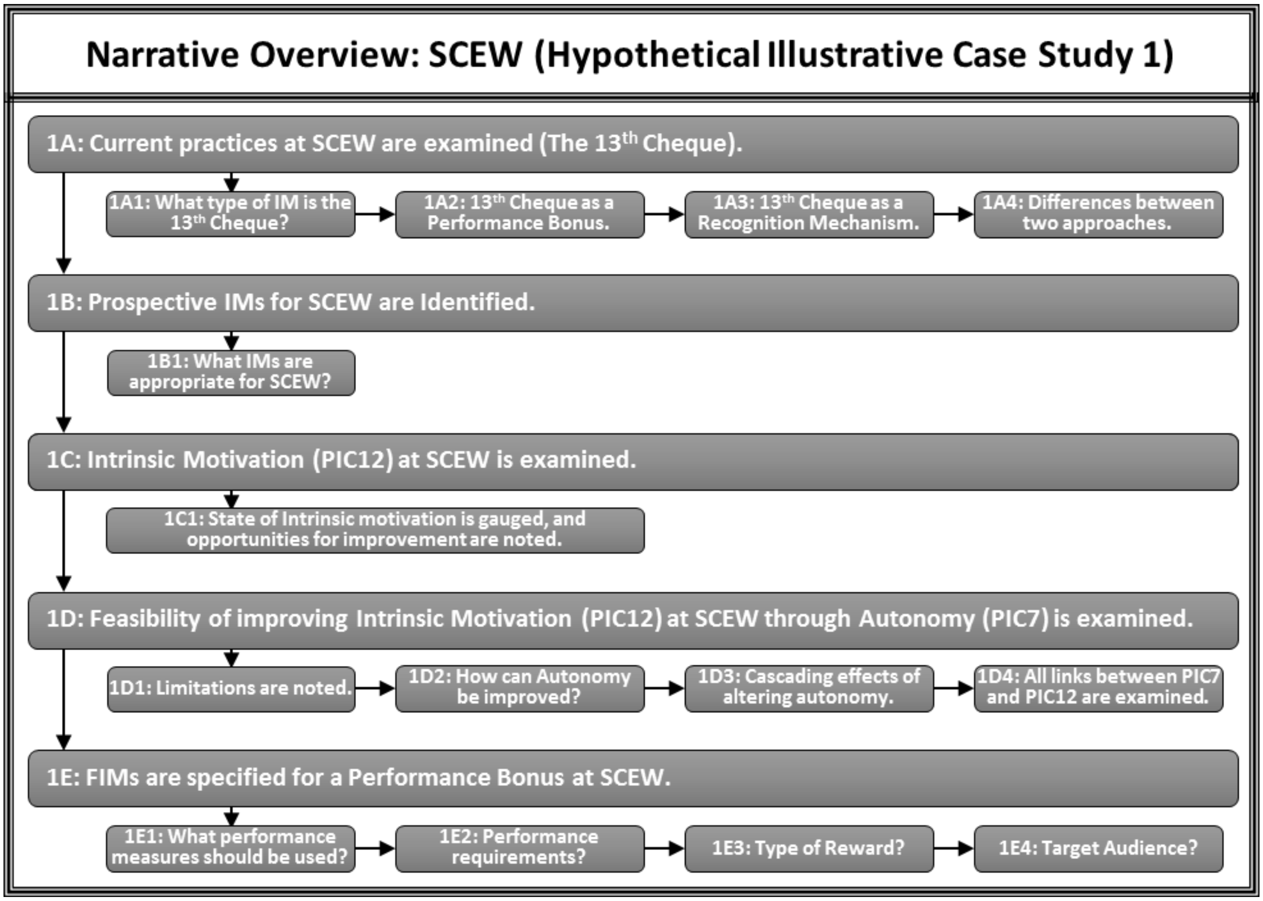


Figure 17-1: The flow of the narrative for SCEW

A summary of what aspects of the DSS is demonstrated in each part can be found in the review subsection that follows the narrative.

1A: Current Practices – The 13th Cheque

Mrs P. Vessel does not have a specific issue that she wants to address, but is rather interested in improving the artisan's overall level of engagement. Before Mrs P. Vessel considers what additional Incentive Mechanisms (IMs) she can employ, she might wish to take a look at current practices. Thus, after familiarising herself with the 13 PICs, Mrs Vessel's attention shifts to the practice of paying employees a 13th cheque.

1A1: Performance Bonus or Recognition Mechanism?

Noting the types of IMs, the 13th cheque can either be construed as being a Performance Bonus (IM2) or a form of Recognition (IM5). The difference is that a Performance Bonus focuses on the bonus, usually a monetary reward, being contingent on performance, while Recognition Plans express appreciation retrospectively. This can be deduced by considering IM2 and IM5's links with the Features of Incentive Mechanisms (FIMs) as per the Cascading Effects Models; CEM-IM2 and CEM-IM5 (IM–FIM5, 6, 7, 8, and 9 vs. IM–FIM27, 28, 29, and 30). The relevant IM–FIM Links can be identified on the left bottom of the Cascading Effects Models (CEMs) as shown in Figure F-1. As with all CEMs CEM-IM5 and CEM-IM2 are also accompanied by a summary with sufficient information to quickly deduce this. There can be some overlap between IM2 and IM5; employees might see the 13th cheque as a gesture of appreciation, alternatively the 13th cheque functions as a Performance Bonus if it is understood to be reliant upon the company performing well. CEM-IM2 and CEM-IM5 quickly reveal, as shown in Figure F-2, that the only characteristic effects are; emphasising the Recognition aspects has a positive effect on Relatedness/Purpose (IM→PIC37), but can cause employees to curry favour instead of optimising performance (IM→PIC39). Generic links, shown with dotted lines in Figure F-2, are dependent on the FIM specification as per the IM–FIM Links discussed above.

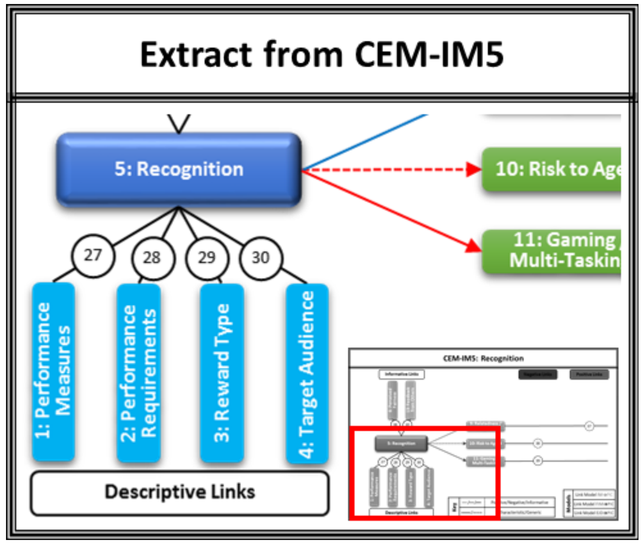


Figure F-1: The designation of IM–FIM Links can be found on the left hand bottom of the CEMs as depicted here

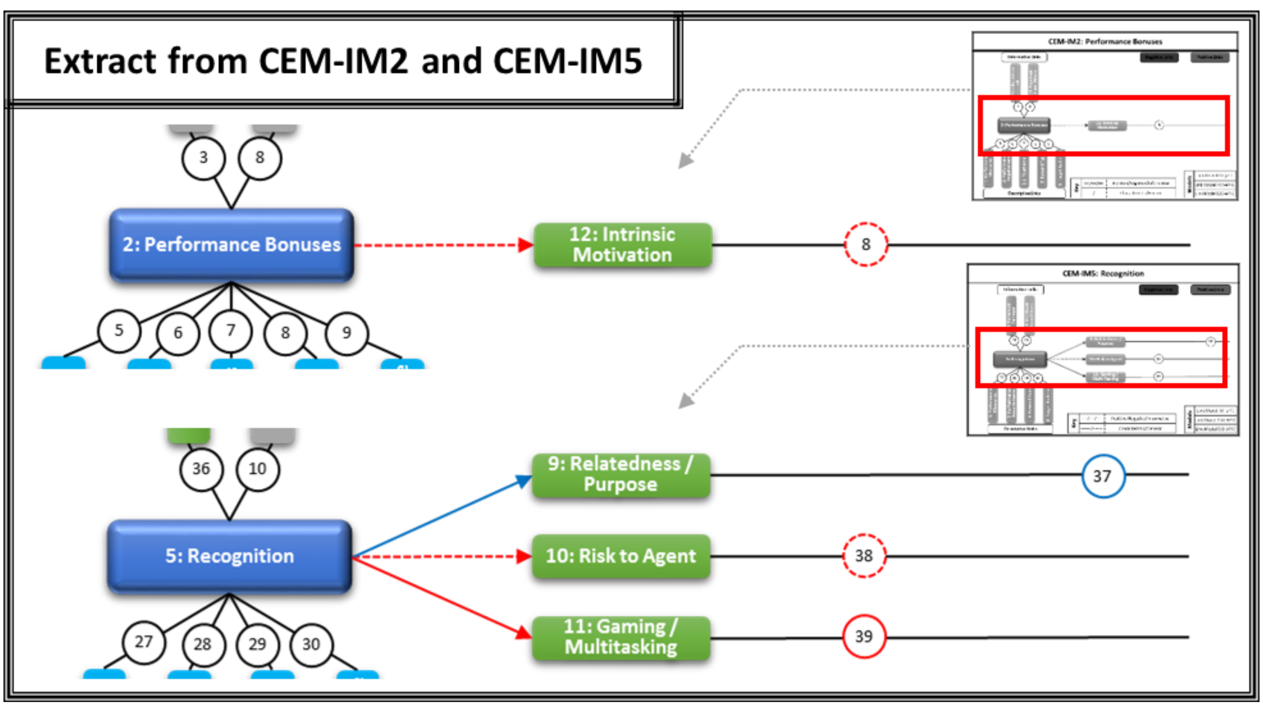


Figure F-2: The solid lines to the right of the IMs on the CEMs indicate characteristic links

Taking a quick look at the Integrated Links Model (ILM) Segments for Relatedness/Purpose (ILM Segment 9) and Gaming/Multitasking (ILM Segment 11), illustrated in Figure F-3, reveals that Relatedness/Purpose is one of the primary drivers of PIC12 (Intrinsic Motivation) as per PIC↔PIC40. Recognition Plans are thus expected to have a positive effect on Intrinsic Motivation (PIC12). On the other hand Performance Bonuses can have a negative effect on Intrinsic Motivation through its use of tangible rewards as an extrinsic motivator (IM→PIC8), as can be seen on CEM-IM2 as shown in Figure F-2.

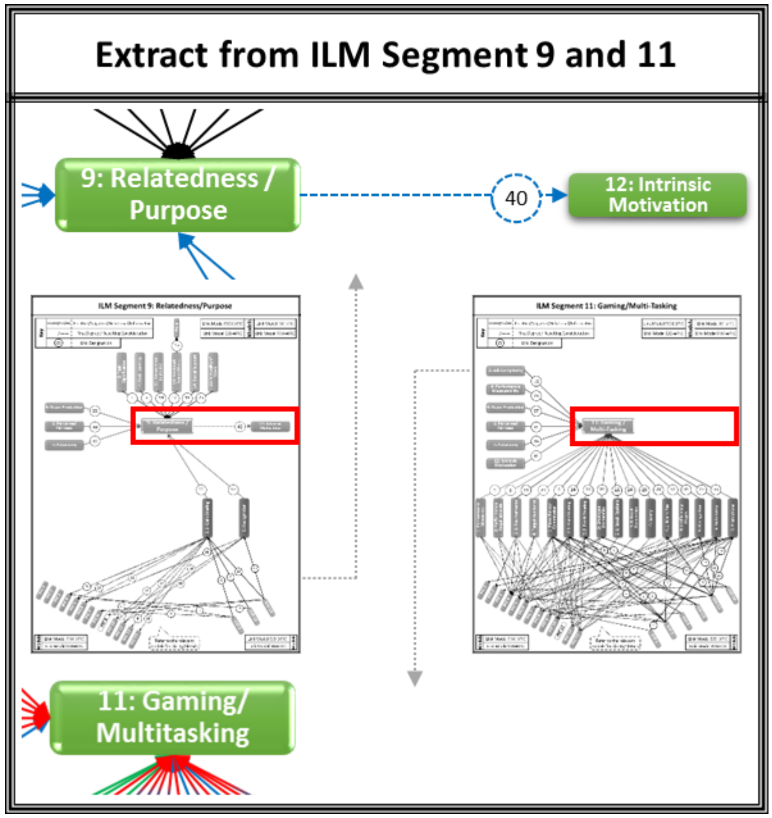


Figure F-3: Dotted lines to the right of the focus PIC on the ILMs indicates PICs that are affected by the focus PIC

It follows that the basic trade-off between structuring the 13th cheque as a Performance Bonus or Recognition mechanism is between intrinsic and extrinsic motivation. This is achieved by emphasising the 13th cheque as performance contingent, or by not doing so. IM2 has no characteristic links on CEM-IM2, as can be seen in Figure F-2, since its FIMs vary greatly between configurations. In this case, if Mrs Vessel wants to analyse the use of the 13th cheque further, it would be necessary to consult Link Model FIM→PIC.

1A2: 13th Cheque as a Performance Bonus

If Mrs P. Vessels uses the 13th cheque as a Performance Bonus, contingent on a subjective evaluation determining whether the company has performed well during the year, the follows consideration is brought to her attention by considering CEM-IM2 as shown in Figure F-2:

- Negative link with Intrinsic Motivation as per IM→PIC8: By using a tangible reward as an extrinsic motivator there can be a crowding out effect of Intrinsic Motivation as per FIM→PIC17.

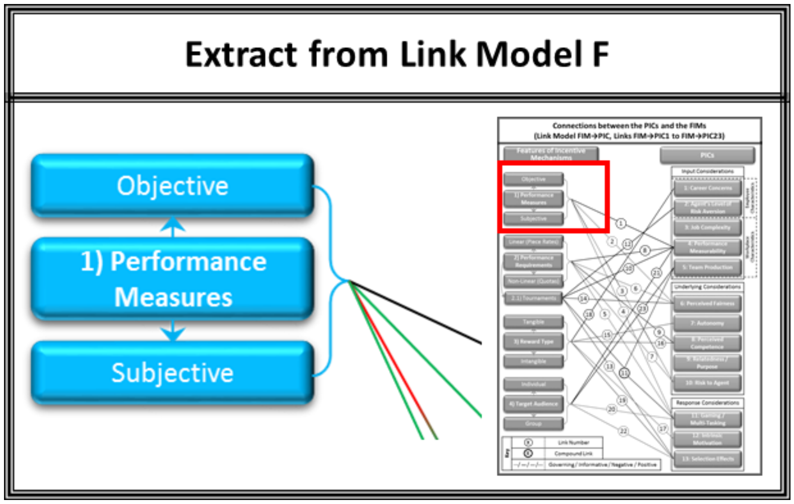


Figure F-4: Each FIM has various links to the PICs highlighted in Link Model FIM→PIC

If the FIMs of the 13th cheque are specified Link Model FIM→PIC can be used to obtain further considerations. This is done by stepping through the FIM→PIC Links and noting those that are applicable in this situation. The simplest way to do this would be to consider the FIMs one at a time in Link Model FIM→PIC. When FIM1 (Performance Measures) has been defined, Link Model FIM→PIC can be used to study the relevant links as depicted in Figure F-4. This involves noting the link's designation, and finding the link's description in the descriptive list of FIM→PIC Links. The information highlighted in the link can then be considered alongside FIM1's configuration in this scenario, and the applicable considerations can be drawn. This process can then be repeated for each FIM. The considerations highlighted for the 13th cheque as a Performance Bonus at SCEW are as follows:

- In relation to FIM1 (Performance Measures – A subjective rating of company performance):
    - Negative link with Perceived Fairness as per FIM→PIC2: This subjective performance measure can have a negative effect on Perceived Fairness, especially if the outcome is not as the employees expect. Transparency, cognitive biases in evaluation, and the firm's motivation to under report contribute to this.
    - Negative link with Risk to Agent as per FIM→PIC3: As the subjective measures are not enforceable by a court the employees are at risk of the firm reneging on its promises.
    - Positive link with gaming as per FIM→PIC4: Using subjective measures makes it difficult for employees to game the system as no measures can be easily manipulated.
    - Negative link with gaming as per FIM→PIC4: Employees can manipulate the measurements by currying favour instead of optimising performance.
- In relation to FIM2 (Performance Requirements – A non-linear unspecified threshold):
    - Positive link with Gaming/Multitasking as per FIM→PIC5: Whilst the plan is technically non-linear as it makes use of a single milestone, the milestone is not defined and subjective. While this presents other problems the lack of transparency makes gaming very difficult in this regard.
    - Negative link with Perceived Fairness as per FIM→PIC6: The non-linear, unspecified, performance requirement affects employees' perception of fairness negatively.
    - Negative link with Risk to Agent as per FIM→PIC7: The step function nature of thresholds put employees at risk of not receiving a reward for effort exerted.
    - Negative link with Perceived Competence as per FIM→PIC9: As performance-based incentives serves as competency signal employees' level of Perceived Competence can be harmed if the reward is not given.

- In relation to FIM3 (Reward Type – A monetary reward, specifically a 13th cheque):
    - Negative link with Intrinsic Motivation as per IM→PIC8 through FIM→PIC17: By using a tangible reward as an extrinsic motivator there can be a crowding out effect of Intrinsic Motivation.
- In relation to FIM4 (Target Audience – All of the employees):
    - Negative link with Gaming/Multitasking as per FIM→PIC20a: Team based systems are susceptible to the free-rider or 1/n problem.
    - Positive link with Gaming/Multitasking as per FIM→PIC20c: Team based systems stimulate cooperation.
    - Negative link with Selection Effects as per link FIM→PIC22: The highest performers may choose alternative opportunities where individual results are rewarded more heavily.

The considerations, obtained from considering CEM-IM2 and Link Model FIM→PIC, can be summarised in relation to the PICs they relate to as follows:

Table F-1: The threats and opportunities of SCEW's 13th cheque as a Performance Bonus

PIC	(link) - Opportunities*	(link) - Threats*
PIC6: Perceived Fairness		• FIM→PIC2 - Negatively affected by using purely subjective measures. • FIM→PIC6 - Negatively affected by using unspecified non-linear requirements.
PIC8: Perceived Competence	• FIM→PIC9 - A positive competency signal follows when a reward is given.	• FIM→PIC9 - A negative competency signal can follow a reward not being given.
PIC10: Risk to Agent		• FIM→PIC3 - Employees exposed to risk of firm reneging on promises. • FIM→PIC7 - Employees at risk of not receiving a reward for effort exerted.
PIC11: Gaming/Multitasking	• FIM→PIC4 - Subjective measures make gaming difficult. • FIM→PIC5 – Lack of Transparency makes gaming very difficult. • FIM→PIC20c - Using a team based incentive is good for cooperation.	• FIM→PIC4 - Some risk of currying favour instead of optimising performance. • FIM→PIC20a - Using a team based incentive is subject to the free-rider problem.
PIC12: Intrinsic Motivation		• IM→PIC8 (FIM→PIC17) - Possible Crowding out effect.
PIC13: Selection Effects		• FIM→PIC22 - Negative sorting effects as individual results are not rewarded.

*The summary does not repeat the link's information, but is derived from consulting it.

This provides Mrs Vessel with a summary of the threats and opportunities of using the 13th cheque as a Performance Bonus in the manner specified. This summary can be used by Mrs Vessel; to analyse the use of a 13th cheque as a Performance Bonus, to mitigate and capitalise on the threats and opportunities, and to compare with a similar summary of the threats and opportunities when the 13th cheque is used as a Recognition mechanism.

1A3: 13th Cheque as a Recognition Mechanism

If Mrs P. Vessels uses the 13th cheque as a Recognition mechanism, not contingent on performance, the following considerations are brought to her attention by considering CEM-IM5, as shown in Figure F-2:

- Positive link with Relatedness/Purpose as per IM→PIC37: Recognition communicates to employees that they are valued.
- Negative link with Risk to Agent as per IM→PIC38: There is some risk of employees not receiving the Recognition, in this case in the form of a month's salary, which they might be expecting.
- Negative link with Gaming/Multitasking as per IM→PIC39: Employees can exert effort currying favour instead of optimising performance. This is not as likely with team based, as opposed to individual, incentives.

With the FIMs of the 13th cheque specified, Link Model FIM→PIC can be used to obtain further considerations. The result are similar for FIM3 and FIM4 as that of the 13th cheque as a Performance Bonus. The considerations under FIM1 and FIM2 are however no longer applicable as the Recognition is not performance contingent. Following the same process as in 1A2, as described and illustrated alongside Figure F-4, the considerations are as follows:

- In relation to FIM3 (Reward Type – A monetary reward, specifically a 13th cheque):
  - Negative link with Intrinsic Motivation as per FIM→PIC17: By using a tangible reward as an extrinsic motivator there can be a crowding out effect of Intrinsic Motivation.
- In relation to FIM4 (Target Audience – All of the employees):
  - Negative link with Gaming/Multitasking as per FIM→PIC20a: Team based systems are susceptible to the free-rider or 1/n problem.
  - Positive link with Gaming/Multitasking as per FIM→PIC20c: Team based systems stimulate cooperation.
  - Negative link with Selection Effects as per link FIM→PIC22: The highest performers may choose alternative opportunities where individual results are rewarded more heavily.

The considerations, obtained from considering CEM-IM5 and Link Model FIM→PIC, can be summarised as follows:

Table F-2: The threats and opportunities of SCEW's 13th cheque as a Recognition mechanism

PIC	(link) - Opportunities*	(link) - Threats*
PIC9: Relatedness/Purpose	• IM→PIC37 - Can communicate to employees that they are valued.	
PIC10: Risk to Agent		• IM→PIC38 (FIM→PIC7) - Employees might not have their expectations met.
PIC11: Gaming/Multitasking	• FIM→PIC20c - Using a team based incentive is good for cooperation.	• IM→PIC39 - Some risk of currying favour instead of optimising performance. • FIM→PIC20a - Using a team based incentive is subject to the free-rider problem.
PIC12: Intrinsic Motivation		• FIM→PIC17 - Possible Crowding out effect due to large monetary reward.
PIC13: Selection Effects		• FIM→PIC22 - Negative sorting effects as individual results are not rewarded.

*The summary does not repeat the link's information, but is derived from consulting it.

This provides Mrs Vessel with a summary of the threats and opportunities of using the 13th cheque as a Recognition mechanism in the manner specified. This summary can be used by Mrs Vessel; to analyse the use of a 13th cheque as a Recognition mechanism, to mitigate and capitalise on the threats and opportunities, and to compare with a similar summary of the threats and opportunities when the 13th cheque is used as a Performance Bonus.

1A4: Differences between the 13th cheque as a Performance Bonus or Recognition mechanism

Per definition, the 13th cheque as Performance Bonus aims to motivate employees by giving them an incentive if they perform better. When used as a non-performance contingent Recognition mechanism this extrinsic motivator does not apply. The differences in the effects on the PICs between the two approaches, as extracted form Table F-1 vs. Table F-2, is as follows:

Table F-3: The differences in threats and opportunities between the 13th cheque as Performance Bonus or Recognition Mechanism

PIC	Differences in Threats and Opportunities
PIC6: Perceived Fairness	As Performance Bonus the 13th cheque can harm Perceived Fairness as it uses subjective performance measures in a non-linear fashion.
PIC8: Perceived Competence	As Performance Bonus the 13th cheque can send either positive or negative performance feedback influencing Perceived Competence.
PIC9: Relatedness/Purpose	As Recognition plan the 13th cheque can communicate to employees that they are valued.
PIC10: Risk to Agent	While both approaches put the agent at some risk of not receiving an expected reward, the Performance Bonus has a larger risk associated with it as the employees will exert more effort to obtain the performance contingent bonus, but might then not receive it.

Mrs P. Vessel can now compare the two options against each other. In short, using the 13th cheque as a Performance Bonus poses a threat to Perceived Fairness, can either harm or support Perceived Competence, and poses a bigger risk to the employees. The 13th cheque as Recognition mechanism does not provide the extrinsic incentive, but stimulates employees' sense of relatedness.

1B: Analysing Prospective Incentive Mechanisms

With employee engagement in mind, especially that of the artisans, Mrs Vessel might want to discern which types of Incentive Mechanisms would work well in her situation.

1B1: Quick Survey of the Appropriateness of IMs

As a point of departure Mrs Vessel can survey the appropriateness of the typical Incentive Mechanisms. In this regard the Cascading Effects Models (CEMs) are useful, the informative links between PICs and Incentive Mechanisms (IMs) can be used to form a preliminary idea about the suitability of IMs. By looking at the left hand top of the CEMs, as shown in Figure F-5, for any 'informative' links between the IMs and PICs various inferences can be drawn. This is done by considering the relevant links against the current scenario. Table F-4 contains a summary of the inferences that can be made in SCEW's case:

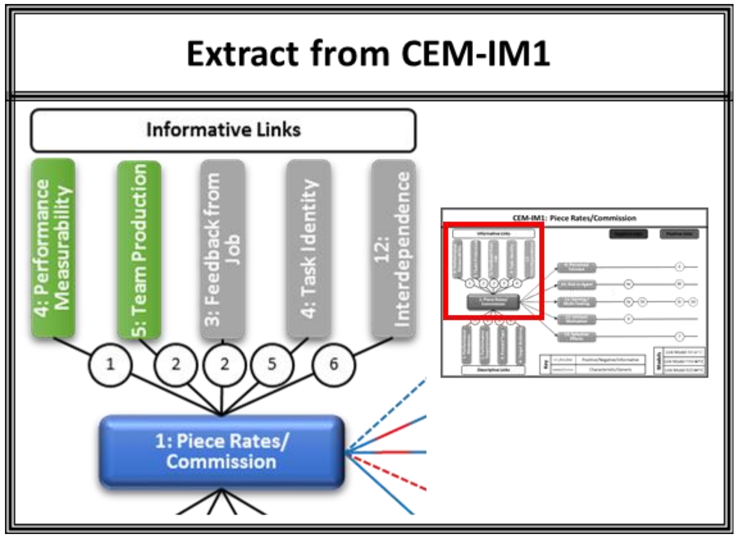


Figure F-5: Informative links on the CEMs, between PICs and the IMs, can be used to gauge the suitability of an IM in a specific setting

Table F-4: IM's appropriateness for SCEW as per the informative links on the CEMs

IMs	Link*	Discussion	Conclusion
IM1	IM→PIC1 – [**Piece Rates typically work well for 'simple' jobs where individual performance is easy to measure**: Due to Piece Rates typically awarding individuals 'per unit produced' it is noted that where "workers carry out 'simple' jobs, in the sense that aggregate measures of performance are available; it is for these jobs that Piece Rates are most likely to work" (Prendergast, 1999, p. 17). This corresponds with link FIM→PIC1 and FIM→PIC8.]	Simple performance measures are not available for the artisans as the pressure vessels produced vary significantly in complexity.	Very inappropriate
	IM→PIC2 – [**Piece Rates do not work well in a team setting**: Due to the focus on individual performance it is not surprising that piece rates "do not fit well with the team approach" (Noe, Hollenbeck, Gerhart, & Wright, 2006, p. 510). This is in line with link FIM→PIC23.]	Artisans operate with some degree of Task Interdependence.	
IM2	-	-	-
IM2.1	IM→PIC9*	While physical output is hard to measure the financial performance of the group is readily available. Uncontrollable economic influences do exist, but are limited.	Moderately appropriate
	IM→PIC10*	Artisans operate with a relatively low level of Task Interdependence.	
IM2.2	-	-	-
IM3 IM3.1 IM3.2 IM3.3	IM→PIC16*	While there are information asymmetries they are not great. No perfect performance measures exist, yet various options are available.	Moderately inappropriate
IM4 IM4.1	-	-	-
IM4.2	IM→PIC30*	No perfect performance measures exist, yet various options are available.	Moderately appropriate

IM4.3	IM→PIC34*	The company is relatively small, employee retention is not a current issue, and Deferred Compensation is not currently practiced.	Moderately inappropriate
IM5	IM→PIC36*	There are no noteworthy issues with Perceived Fairness at present.	Moderately appropriate
IM5.1	IM→PIC36*	There are no noteworthy issues with Perceived Fairness at present.	Neutral
	IM→PIC40*	No perfect performance measures exist, yet various options are available.	
IM6	-	-	-
IM7	IM→PIC50*	The artisans are not specifically concerned with Career Concerns.	Neutral
	IM→PIC51*	The artisans are taken to be moderately risk averse on average.	
IM7.1	IM→PIC50*	The artisans are not specifically concerned with Career Concerns.	Neutral

*The information contained in the links is not included here for brevity's sake, it can be found in the database. This excludes link IM→PIC1 and IM→PIC2 to demonstrate how the link and discussion columns fit together.

The appropriateness of the undefined IMs on Table F-4 is gauged as follows:

- IM2: Performance Bonuses (Moderately appropriate): IM2 is not well defined by its Cascading Effects Model (CEM) due to the variety of Performance Bonuses. When considering IM2's FIMs in this situation (IM–FIM5, 6, 7, 8, and 9) IM2 seems moderately appropriate.
- IM2.2: Profit-sharing (Neutral): As Gainsharing is an appropriate option it supersedes Profit-sharing.
- IM4.1: Merit Pay (Moderately appropriate): When considering IM4.1's FIMs (IM–FIM21, 24, 26, 19, and 20) IM4.1 seems moderately appropriate.
- IM6: Autonomy (Neutral): Autonomy as an IM is dependent on performance measures (IM–FIM33 and IM–FIM34) which are available to some degree. Limitations and PICs however inhibit using Autonomy as an IM.

In summary, the IMs that seem appropriate for the artisans in SCEW's situation are:

- IM2: Performance Bonuses
- IM2.1: Gainsharing
- IM4.1: Merit Pay
- IM4.2: Efficiency Wages
- IM5: Recognition

Mrs Vessel can take a closer look at these IMs to determine their suitability. Note that IM2 and IM5, the configurations of the 13th cheque, is on the list. If various options exist on the Integrated Links Model (ILM) when a certain PIC is focused on, this list can also be taken into consideration.

1C: PIC12 - Intrinsic Motivation

While Mrs Vessel might be interested in using an Incentive Mechanism (IM) to provide some form of extrinsic motivation, she would do well not to ignore Intrinsic Motivation as described by PIC12. Integrated Links Model (ILM) Segment 12 can be used to gauge the considerations surrounding Intrinsic Motivation, identify Opportunities for Improvement (OFIs), and understand how IMs might interact with Intrinsic Motivation.

1C1: The State of Intrinsic Motivation and Identification of Opportunities for Improvement

The design of IM practices can focus more on Intrinsic Motivation, focus more on extrinsic motivation, or attempt to stimulate both with a balanced approach. Intrinsic Motivation is notoriously hard to measure, while tools such as the Gallup's Q^{12} ("The Gallup Workplace Audit" or GWA) can gauge employee engagement (Harter, Schmidt, Killham, & Asplund, 2009), no reliable direct measure for Intrinsic Motivation exists. The 13 PICs can be used to survey how Intrinsic Motivation is connected to the other PICs, and any practices related to IMs. This can reveal any considerations that might not have been taken into account and are easy to improve, and can provide some insights into the state of Intrinsic Motivation at SCEW. Mrs Vessel's analysis of the considerations surrounding Intrinsic Motivation at SCEW could start with ILM Segment 12. This model shows:

- PICs linked to Intrinsic Motivation, including the type and description of the link.
- FIMs linked to Intrinsic Motivation, including the type and description of the link.
- Elements of Job Design (EJD) that can be used to influence Intrinsic Motivation, including the type and description of the link.
- IMs that affect Intrinsic Motivation, including the type and description of the link.

The links with EJD, IMs, and PICs provides information regarding the 'levers that could be pulled' or actions that could be taken in influence Intrinsic Motivation through IMs and EJD. At this stage Mrs Vessels would thus only consider the PIC↔PIC Links, or the connections to the other PICs, shown on the left hand side of the ILMs as illustrated in Figure F-6. This can be used to gauge the state of the practices surrounding Intrinsic Motivation, and identify any Opportunities for Improvement (OFIs). A summary of the analysis is shown on Table F-5:

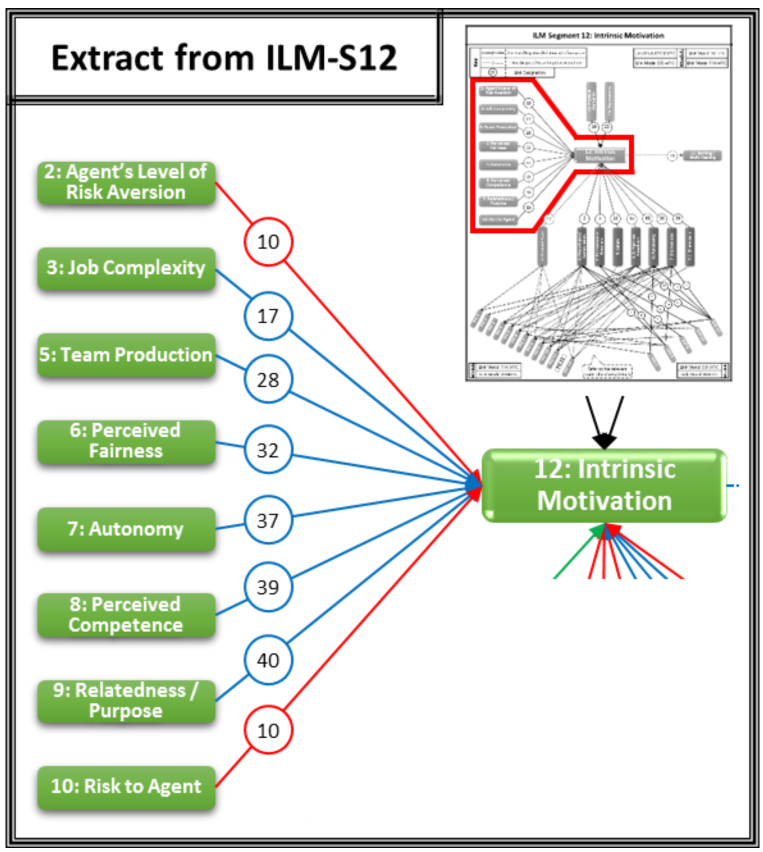


Figure F-6: PICs affecting the focus PIC can be found on the left hand of the ILMs

Table F-5: An analysis of Intrinsic Motivation at SCEW according the ILM Segment 12

PIC	Link*	Discussion	Status of Link (-3 to 3)	OFI** (0-4)
PIC3: Job Complexity	PIC↔PIC17 – [**Employees with high growth needs are more likely to be intrinsically motivated in complex jobs**: The phenomena observed by Hackman & Oldham (1976, p. 255) that "employees with high measured needs for growth responded more positively to complex jobs than did employees low in growth need strength" is supported and explained by contemporary authors as follows: "Individuals with high growth need strength will seek out opportunities to grow and act creatively in complex jobs even when they are not encouraged by their work context to perform creatively. In this situation, complexity can substitute for the lack of support by augmenting high growth need strength with job-related opportunities to fulfill growth desires" (Shalley, Gilson, & Blum, 2009, p. 492).]	While some fine-tuning is always possible, the growth needs of artisans are typically well met by working in their profession, as they have the opportunity to do at SCEW.	Somewhat positive (1)	Minor (1)
PIC5: Team Production	PIC↔PIC28 – [**Team Production settings are expected to have a positive effect on internal motivation**: Noting the link between Team Production and Relatedness/Purpose and the link between the latter and Intrinsic Motivation is flows that Team Production will typically have a positive influence on Intrinsic Motivation. This is noted by Hackman & Oldham (1976, p. 277): "people ... experience greater internal motivation when they are satisfied with on-the-job relationships than when they are dissatisfied with these relationships."]	The workshop setting artisans function in at SCEW creates a Team Production setting. While the experience of operating in a team could be improved in some regards, the basic elements are in place.	Positive (2)	Minor (1)
PIC6: Perceived Fairness	PIC↔PIC32*	While Perceived Fairness is hard to gauge there seems to be a healthy amount of trust between the artisans and Mrs Vessels. Considering ILM Segment 6 reveals no practices that are expected to cause any considerable harm.	Positive (2)	Minor (1)
PIC7: Autonomy	PIC↔PIC37*	Artisans have varying degrees of Autonomy in different areas. Method Autonomy is restricted to a large degree at SCEW as Mrs Vessel is very concerned with health and safety regulations. Scheduling Autonomy is very limited. There is some degree of team Autonomy.	Somewhat negative (-2)	Significant (3)
PIC8: Perceived Competence	PIC↔PIC39*	Artisans at SCEW are generally responsible for tasks that are well aligned with their abilities, this is conductive to feeling efficient, effective, and even masterful in one's behaviour, rather than incompetent and ineffective. There may however be some room for additional competency signals.	Somewhat positive (1)	Minor (1)
PIC9: Relatedness/ Purpose	PIC↔PIC40*	At face value the artisans at SCEW do not seem to have major issues with Relatedness/Purpose. There is a healthy team environment and signs of camaraderie, most artisans have been part of the team for a considerable time. At the same time there are challenges with imbuing the making of	Somewhat positive (1)	Moderate (2)

		pressure vessels in and of itself with a sense of purpose. There seems to be some OFIs when ILM Segment 9 is considered.		
PIC2: Agent's Level of Risk Aversion *and* PIC10: Risk to Agent	PIC↔PIC10*	The artisans at SCEW are not exposed to much risk. There are no significant common risks, and no incentive plan that has significant risks associated with it.	Positive (2)	Minor (1)

*The information contained in the links is not included here for brevity's sake, it can be found in the database. This excludes link PIC↔PIC17 and PIC↔PIC28 to demonstrate how the link and discussion columns fit together.
**Opportunities for improvement.

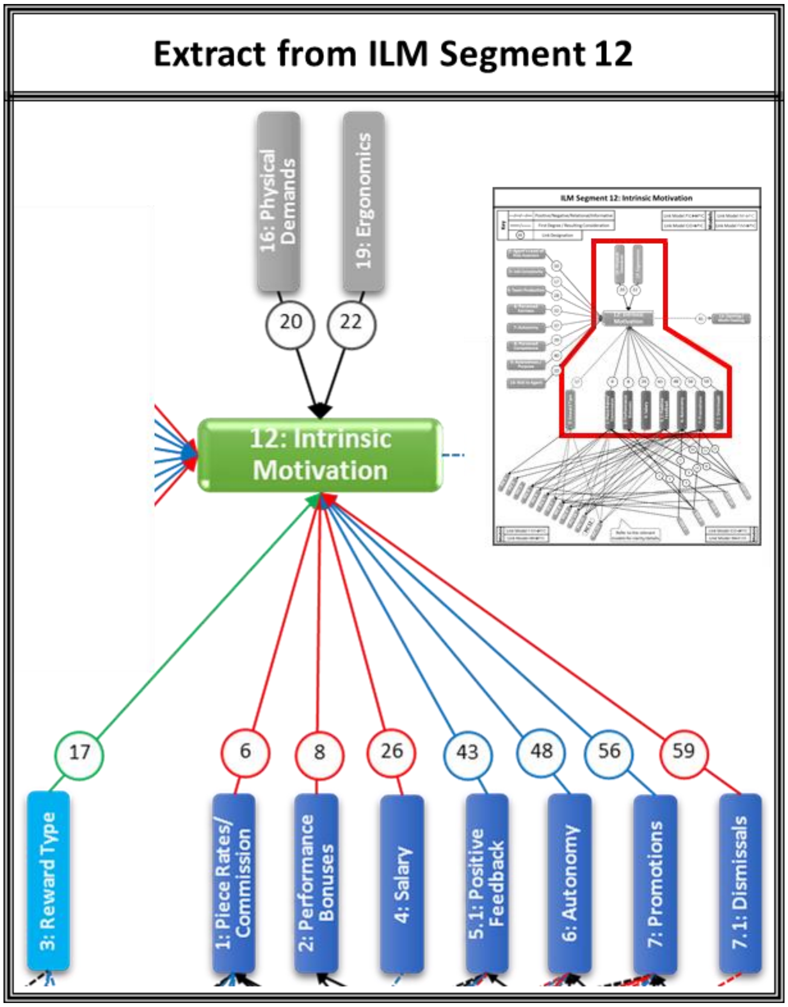


Figure F-7: A focus PIC is influenced not only by other PICs, but by EJD, FIMs, and IMs as well

The links between Intrinsic Motivation and the other PICs suggests that the Intrinsic Motivation of the artisans at SCEW should be relatively healthy. While there is certainly minor improvements that could be made, it can be safely assumed that the level of Intrinsic Motivation is not a major issue at present. The one opportunity for improvement that stood out on Table F-5 was Autonomy. In addition to this ILM Segment 12 suggests, as shown in Figure F-7, that two EJD can be used to influence Intrinsic Motivation. Aside from the various IMs that influence Intrinsic Motivation one Feature of Incentive Mechanisms (FIM) typically also has a certain affect (FIM→PIC17). Considering the link with EJD16 through link EJD→PIC20, and the link with EJD19 through link EJD→PIC22, does not reveal significant Opportunities for Improvement (OFIs). The same holds for the link with FIM3 through link F FIM→PIC7, though this will become relevant when Incentive Mechanisms are applied. The main opportunity for improvement, aside from specifically applying new IMs, thus remain Autonomy through link PIC↔PIC37 as per Table F-5.

1D: Improving Intrinsic Motivation through Autonomy

Having identified Autonomy as an opportunity for improvement, especially with regard to improving Intrinsic Motivation, Mrs Vessel may want to determine the suitability of providing employees with more Autonomy in more detail. It certainly is true that more Autonomy will improve Intrinsic Motivation as per link PIC↔PIC37, this can however not be done without considering the limitations, and the effects on other PICs.

1D1: Limitations

As Mrs Vessel is the owner, she has no managerial restrictions. There are still limitation as to how much Autonomy can be given to artisans. Certain procedures and regulations must be adhered to, and planning is required to organise the work done in the workshop. As per PIC7 there are four types of Autonomy, the scope for varying the levels at SCEW with each of the types is as follows:

- Method Autonomy: At SCEW Method Autonomy is not only restricted by procedural requirements, but also by various rules imposed by Mrs Vessel to ensure adherence to health and safety regulations. There seems to be some scope to analyse the onsite rules at SCEW, while health and safety regulations must be met, there are various disadvantages to constricting artisan freedom more than required.
- Scheduling Autonomy: The planners specify what tasks artisans must do, and artisans are to do this during regular working hours. There is thus little to no Scheduling Autonomy. While there might be some way of taking artisan preference into account when tasks are designated, efficient scheduling requires a controlled process. The difficulty of determining how long tasks should take and Task Interdependence prohibits the use of flexi hour arrangements. There is thus little room for Scheduling Autonomy.
- Criteria Autonomy: Not applicable, no performance measures in place.
- Team Autonomy: While the team, in the workshop as a whole, is fixed, artisans can be given some degree of freedom in deciding who to work with on certain projects. This is the current practice at SCEW.

Without extensive Job Design there is thus only room for some additional Method Autonomy, and this is pending an analysis of current practices and health and safety regulations.

1D2: Ways of improving Autonomy (as per the Integrated Links Model Segment 7)

While keeping the limitations in mind Mrs Vessels can consult Integrated Links Model (ILM) Segment 7 for ways that PIC7 can be modified, as shown in Figure F-8. PIC2, through link PIC↔PIC8, notes that "providing risk averse employees with Autonomy that introduces uncertainties have costs." This does not provide a lever, but reminds the user that exposing risk averse employees to the uncertainties through the provision of Autonomy can be counterproductive. Incentive Mechanism #6 (IM6), in accordance with the Feature of Incentive Mechanisms #3 (FIM3) as per link FIM→PIC15 or IM→PIC45, points out that when Autonomy is used as an Incentive Mechanism it leads to more Autonomy. There is thus an option of introducing Autonomy as an Incentive Mechanism, or designing it directly into the job through Job Design as indicated on ILM Segment 7 with links EJD→PIC1, 10, 13, and 23. Both approaches are restricted by the limitations noted above. The Elements of Job Design (EJD) that could be used to improve Autonomy as per ILM Segment 7 are discussed below:

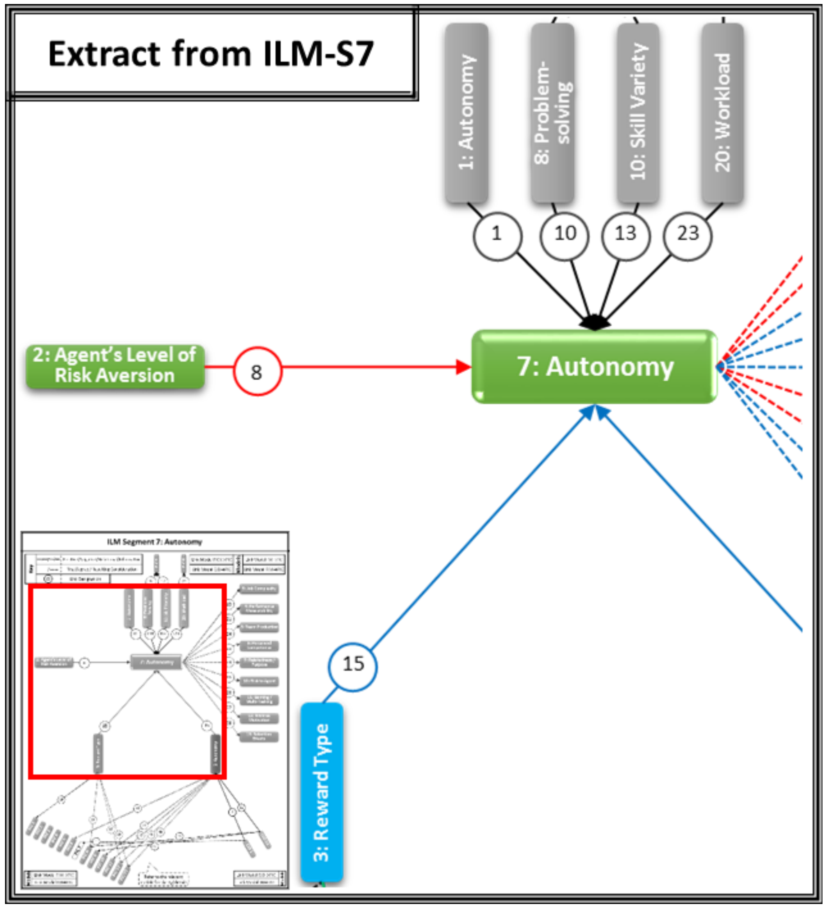


Figure F-8: PICs, EJD, FIMs, and IMs that influence the focus PIC

- EJD1 – Autonomy as per link EJD→PIC1: "Job Design can be used to modify an agent's level of Autonomy". As per the limitations subsection there is potentially room to redesign artisans' jobs so that they have more method Autonomy.
- EJD8 – Problem-solving as per link EJD→PIC10: "High Problem-solving requirements result in (method) Autonomy". At the same time it increases Job Complexity, as per link EJD→PIC9 as seen in Figure F-9, eventually resulting in more risk to the employee as per link PIC↔PIC35 via link PIC↔PIC13 and

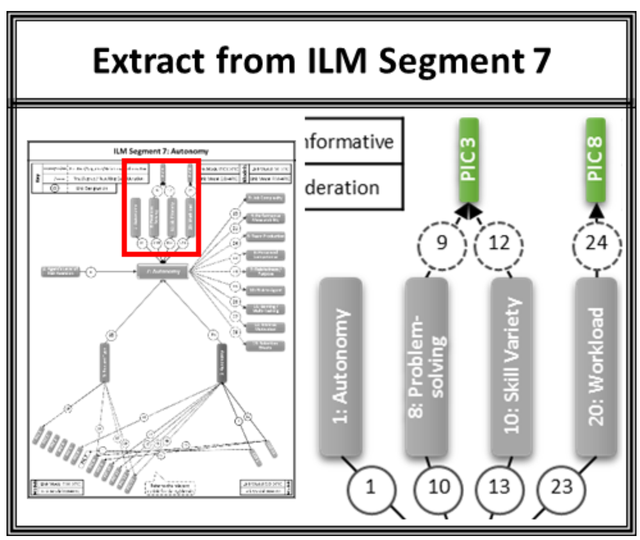


Figure F-9: Some EJD have cascading effects

PIC↔PIC15. The scope for Problem-solving is determined by the available jobs and tasks. There is some scope for dividing tasks so that less risk averse individuals, as per link PIC↔PIC8, are granted the more complex jobs.

- EJD10 – Skill Variety as per link EJD→PIC13: "Skill Variety can increase perceptions of Autonomy". There is thus some scope of allocating different tasks to individual artisans, as opposed to giving each individual identical tasks. At the same time it increases Job Complexity, as per link EJD→PIC12 as seen in Figure F-9, eventually resulting in more risk to the employee as per link PIC↔PIC35 via link PIC↔PIC13 and PIC↔PIC15. It can thus be sensible to divide tasks so that less risk averse individuals, as per link PIC↔PIC8, are granted more room for Skill Variety.
- EJD20 – Workload as per link EJD→PIC23: "An excessive workload can hamper perceived Autonomy". Careful consideration is to be given to the workloads at SCEW, especially since there is currently more work available than can be handled. With Intrinsic Motivation in mind, it can also be noted in Figure F-9 as per link EJD→PIC24 that a balanced Workload fosters Perceived Competence, which is one of the key drivers of Intrinsic Motivation as per link PIC↔PIC40.

In summary, the best options for improving Autonomy seems to be through Job Design with EJD1, EJD8, EJD10, and EJD20. Aside from with EJD20 there is a trade-off with employees being exposed to more risk, this can be a problem depending on the state of PIC2 as per PIC↔PIC8.

1D3: Basic SWOT Analysis / Cascading Effects (ILM/PIC↔PIC Links)

As the EJD considered hinted at, there are negative effects or threats associated with increasing the levels of Autonomy. In order to gain an overview of the pros and cons or threats and opportunities, to enable better decision-making, Mrs Vessel could consider the links between Autonomy and the other PICs. Note that this is in relation to the limitations and options discussed above. Special attention is paid to the PICs affected by Autonomy, that is to say the PICs on the right hand side of the ILM as illustrated in Figure F-10, or the PICs in Link Model PIC↔PIC that Autonomy points towards. The relevant links, as per ILM Segment 7, are discussed below on Table F-6:

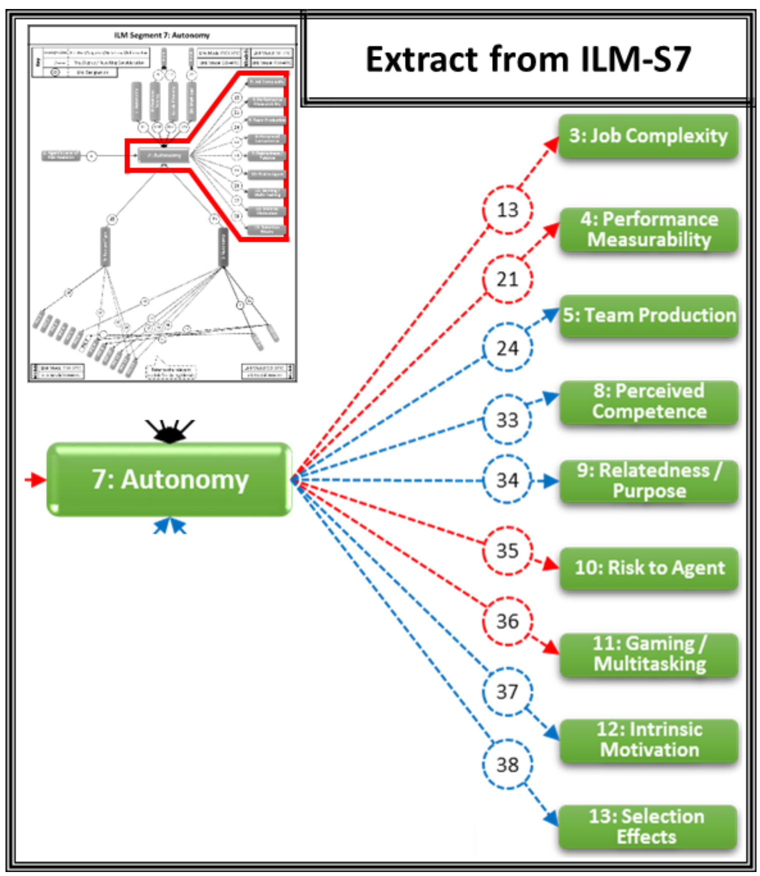


Figure F-10: PICs affected by a focus PIC can be found on the right hand side of the ILMs

Table F-6: The effects altering the level of Autonomy has on other PICs as per ILM Segment 7

PIC	Link*	Discussion	Summary	Severity
PIC3: Job Complexity	PIC<->PIC13 (N) – [**Job Complexity generally increases as Autonomy increases**: It has long been held that "autonomy serves, at least in part, to summarize the overall complexity of a job" (Hackman & Oldham, 1976, p. 273). Contemporary constructs that seek to measure Job Complexity, such as analysts at United States Department of Labour who developed a dictionary of occupational titles, consider Autonomy, routine, and decisions latitude (Shalley, Gilson, & Blum, 2009).]	Providing more opportunities for Problem-solving and Skill Variety will lead to greater Job Complexity. This does not hold for designing a balanced Workload, or relaxing procedural requirements.	Link relevant, but not with all approaches.	Limited **Notable** Significant
PIC4: Performance Measurability	PIC<->PIC21 (N) – [**As Autonomy increases Performance Measurability becomes more difficult**: "In organisations with a high ambiguity and a low routine, measurement of output is more difficult" (Dooren, 2005, p. 372).]	Performance Measurability does not become more difficult when balancing the Workload or relaxing procedural requirements. Making provision for more Problem-solving requirements and Skill Variety opportunities would also not greatly increase the difficulty of measuring performance.	Link is weak with options discussed above.	**Limited** Notable Significant
PIC5: Team Production	PIC<->PIC24* (P)	As a fair amount of Task Interdependence exists in the workshop, opportunities for Team Production will increase with increased Autonomy. The effect is not expected to be great concerning relaxing procedural requirements, but larger with balancing the Workload.	Link is relevant, but effect is not expected to be great.	Limited **Notable** Significant
PIC8: Perceived Competence	PIC<->PIC33* (P)	Increasing Autonomy in any of the ways discussed above will result in better Perceived Competence. Especially with regards to balancing the Workload. The change is however not expected to be massive.	Link is relevant.	Limited **Notable** Significant
PIC8: Relatedness/ Purpose	PIC<->PIC34* (P)	The required task interdepended exists in the workshop so that increasing Autonomy should result in the expected increase in relatedness. The change is however not expected to be massive.	Link is relevant.	Limited **Notable** Significant
PIC10: Risk to Agent	PIC<->PIC35* (N)	Reducing procedural requirements, and providing more opportunities for Problem-solving and Skill Variety certainly introduces more uncertainties. The risk to employees is however not great with the absence of performance related pay.	Link is relevant, but effect is not expected to be great.	Limited **Notable** Significant
PIC11: Gaming/ Multitasking	PIC<->PIC36* (N)	Since the effect of link PIC<->PIC21 is limited, and there is no performance related pay, increases in opportunities or incentives for Gaming/Multitasking is limited.	Link is weak.	**Limited** Notable Significant
PIC12: Intrinsic Motivation	PIC<->PIC37* (P)	Link PIC<->PIC37 is generic so it is assumed that it holds.	Link is relevant.	Limited Notable **Significant**

PIC13: Selection Effects	PIC↔PIC38* (P)	As SCEW is currently not in the position to hire new staff Selection Effects are irrelevant.	Link is irrelevant.	**Limited** Notable Significant

*The information contained in the links is not included here for brevity's sake, it can be found in the database. This excludes link PIC↔PIC13 and PIC↔PIC21 to demonstrate how the link and discussion columns fit together.

This analysis would seem to suggest that the pros outweigh the cons. Disregarding 'limited' effects, in summary, introducing more Autonomy does increase Job Complexity ('notable') and introduces agents to more risk ('notable'), but has a 'significant' positive effect on Intrinsic Motivation, and a 'notable' positive effect on Perceived Competence, Relatedness/Purpose, and Team Production.

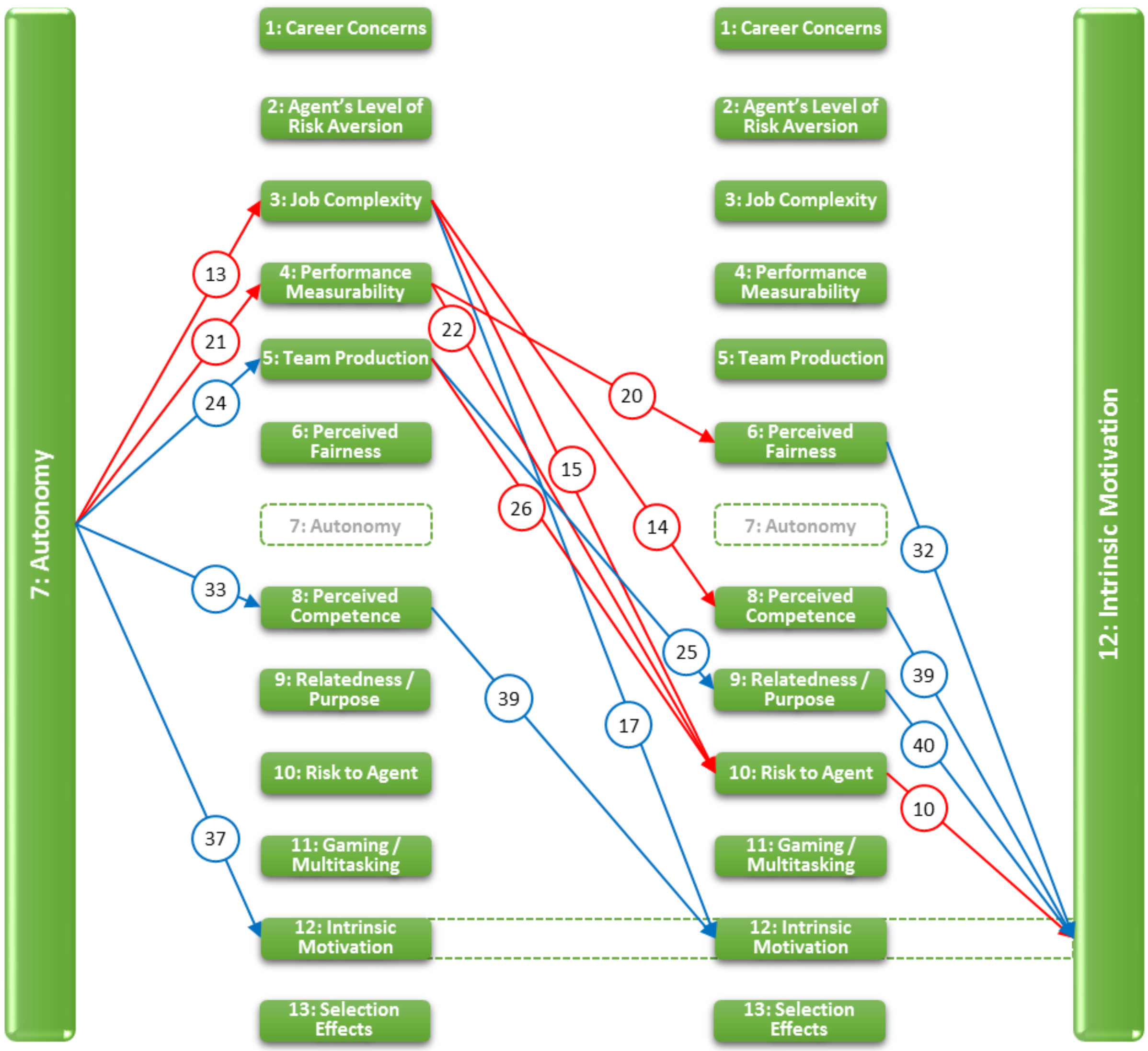
It must be noted that when the scenario changes, this analysis would have to be revisited. If a performance related incentive is introduced for example, links such as PIC↔PIC35 and PIC↔PIC36 could suggest different outcomes.

1D4: All links between Autonomy and Intrinsic Motivation (PIC↔PIC Links)

In this case increasing one PIC, Autonomy, seems like it will have an overall positive effect on another PIC, Intrinsic Motivation. In other scenarios a DSS user might want to analyse the relationship, or links, between two PICs in more detail. The PIC↔PIC Links highlights the noteworthy links between the PICs, in many circumstances there can be a mixture of positive and negative links.

Mrs Vessel might be considering increasing Autonomy, and introducing performance related incentives. In order to test the effect of introducing Autonomy on Intrinsic Motivation, alongside a performance contingent IM, Mrs Vessel should repeat the analysis done on Table F-6. In addition to this, if a more detailed approach is taken, Mrs Vessel can consider all the links between Autonomy and Intrinsic Motivation. All the links between Autonomy and Intrinsic Motivation can be derived from the Link Model PIC↔PIC. A mature User Interface (UI) could include models showing the links between any two PICs as shown for Autonomy and Intrinsic Motivation in Figure 16-2. Note that second-degree links indicated in Link Model PIC↔PIC are not to be duplicated in this analysis. Instead of making an intuitive decision, Mrs Vessel can consider all the links, then make a decision with the new information. This can be either subjectively, or via a more structured process. A structured approach is difficult as weightings and scores would have to be assigned in a subjective manner. While far from a perfect approach, this can help with the decision-making process. Table F-7 contains an analysis and attempt at scoring each link.

The Connections Between PIC7 and PIC12 to the 3rd Degree



First Degree Link	Second-Degree Links	Third-Degree Links
(PIC↔PIC37)	(PIC↔PIC13)→[PIC3]→(PIC↔PIC17) (PIC↔PIC33)→[PIC8]→(PIC↔PIC39)	(PIC↔PIC21)→[PIC4]→(PIC↔PIC20)→[PIC6]→(PIC↔PIC32) (PIC↔PIC13)→[PIC3]→(PIC↔PIC14)→[PIC8]→(PIC↔PIC39) (PIC↔PIC24)→[PIC5]→(PIC↔PIC25)→[PIC9]→(PIC↔PIC40) (PIC↔PIC13)→[PIC3]→(PIC↔PIC15)→[PIC10]→(PIC↔PIC10) (PIC↔PIC21)→[PIC4]→(PIC↔PIC22)→[PIC10]→(PIC↔PIC10) (PIC↔PIC24)→[PIC5]→(PIC↔PIC26)→[PIC10]→(PIC↔PIC10)

Key			
X	Link Number	◯ / ◯	Positive / Negative

Figure 16-2: All the links between Autonomy and Intrinsic Motivation. A Mature UI could show this for any two PICs

Table F-7: Analysing all the links between Autonomy and Intrinsic Motivation

#	Link* & Link Series	Discussion	Weight/ Relevance (1 to 5)	Score/ Severity (-5 to 5)	Weighted Average (-25 to 25)
1	(PIC↔PIC37) Direct [**Increasing Autonomy increases Intrinsic Motivation**: Work from behavioural scientists are adamant that there is a strong link between Autonomy and Intrinsic Motivation (Ryan & Deci, 2000; Gagne & Deci, 2005).]	Link PIC↔PIC37 is not dependent on a situation, but states a general phenomenon, it thus receives a heavy weighting. The scope for Autonomy improvements are significant, but not massive as discussed earlier.	5	3	15
2	(PIC↔PIC13 and PIC↔PIC17) Via PIC3: Job Complexity [**Job Complexity generally increases as Autonomy increases****] & [**Employees with high growth needs are more likely to be intrinsically motivated in complex jobs****]	Increasing Autonomy leads to higher Job Complexity which improves Intrinsic Motivation when employees have high growth needs. The estimated growth needs for SCEW's artisans is significant, but not large. This link is thus moderately relevant. The scope for increasing Job Complexity is notable but not large as per Table F-6.	3	3	9
3	(PIC↔PIC13 and PIC↔PIC14 and PIC↔PIC39) Via PIC3 and PIC8: Job Complexity and Perceived Competence [**Job Complexity generally increases as Autonomy increases****] & [**An employee's Perceived Competence is at risk when the employee's ability does not match the level of Job Complexity ****] & [**Perceived Competence increases Intrinsic Motivation ****]	Increasing Autonomy leads to higher Job Complexity which can decrease Perceived Competence if not aligned with an employee's ability. Perceived Competence is strongly related to Intrinsic Motivation. The expected increase in Job Complexity, as per Table F-6, is only expected to place limited pressure on artisans. The link series does not have conditions limiting its relevance. A score of -6, slightly less negative than row 2 is positive, seems realistic.	3	-2	-6
4	(PIC↔PIC13 and PIC↔PIC15 and PIC↔PIC10) Via PIC3 and PIC10: Job Complexity and Risk to Agent	Increasing Autonomy leads to higher Job Complexity which increase the risk to employees, especially with performance related pay. Risk to employees decrease their Intrinsic Motivation, this effect is not expected to be magnified as artisans are not expected to have high levels of risk aversion. A significant weighting is thus allocated due to the assumption of performance pay being used. The severity should be similar to the expected increase in Job Complexity as per row 2. A negative score similar to that of row 2 seems realistic in light of the use of performance related pay.	3	-3	-9
2, 3,4		A combined score of -6, 40% the magnitude of the direct link, seems realistic. The positive effect on Intrinsic Motivation, directly and through Perceived Competence, is eroded by the extra Job Complexity having a negative effect on employees' Perceived Competence and exposing employees to more uncertainties. Especially in light of the assumption of performance pay.			
5	(PIC↔PIC21 and PIC↔PIC20 and PIC↔PIC32) Via PIC4 and PIC6: Performance Measurability and Perceived Fairness	Increasing Autonomy makes measuring performance more difficult, when this forces the use of subjective measures Perceived Fairness suffers. Perceived Fairness is strongly related to Intrinsic Motivation. As per Table F-6 the increased difficulty measuring performance is expected to be limited, a low score is thus assigned. In this case the balance between subjective and objective measures is not expected to vary substantially, a moderate weighting is thus applied, even though there is a strong link between Perceived Fairness and Intrinsic Motivation.	3	-1	-3

6	(PIC↔PIC21 and PIC↔PIC22 and PIC↔PIC10) Via PIC4 and PIC10: Performance Measurability and Risk to Agent	Increasing Autonomy makes measuring performance more difficult, this increases the risk to employees which diminished Intrinsic Motivation. As per Table F-6 the increased difficulty measuring performance is expected to be limited, the assumption of performance related pay however increases the score again. The weighting is assumed to be similar to row 5.	3	-2	-6
5,6		It seems realistic that the negative impact on Intrinsic Motivation would be greater with regards to Risk to Agent, as opposed to Perceived Competence, as Risk to Agent is affected by the assumption of performance related pay. A combined effect of -6 for the links working through Performance Measurability seems reasonable when compared to the -9 working through Job Complexity when referring to Table F-6.			
7	(PIC↔PIC24 and PIC↔PIC25 and PIC↔PIC40) Via PIC5 and PIC9: Team Production and Relatedness/ Purpose	Increasing Autonomy leads to better opportunities for Team Production in settings with Task Interdependence, Team Production, again in setting with Task Interdependence, enhances relatedness. Relatedness is strongly linked to Intrinsic Motivation The workshop offers a moderate degree of task Interdependence, weighting is thus assumed moderate. As per Table F-6 the increase is not expected to be substantial.	3	2	6
8	(PIC↔PIC24 and PIC↔PIC26 and PIC↔PIC10) Via PIC5 and PIC10: Team Production and Risk to Agent	Increasing Autonomy leads to better opportunities for Team Production in settings with Task Interdependence, Team Production exposes employees to risks. Risk to employees decrease their Intrinsic Motivation. While this effect is not expected to be magnified as artisans are not expected to have high levels of risk aversion, the workshop offers a moderate degree of Task Interdependence, and risk is amplified with the assumption of performance pay, weighting is thus assumed moderate to high. As per Table F-6 the increase is not expected to be substantial.	4	-2	-8
7,8		Row 7 and 8 cancels each other out, with a slightly negative resulting effect on Intrinsic Motivation. This seems reasonable considering the assumption of performance related pay.			
9	(PIC↔PIC33 and PIC↔PIC39) Via PIC8: Perceived Competence	Increasing Autonomy leads to better Perceived Competence, and there is a strong link between Perceived Competence and Intrinsic Motivation. The expected increase in Perceived Competence, as per Table F-6, is notable. As it is similar, but more direct, than row 3 a slightly heavier weighting is applied with a similar score. A score of 8 seems reasonable as it is slightly higher that the negative score in row 2 where Perceived Competence is hampered by increased Job Complexity.	4	2	8

*The information contained in the links is not included here for brevity's sake, it can be found in the database. This excludes rows 1-3 to demonstrate how the link and discussion columns fit together.

**Only link summary included for brevity's sake, details can be found in the database.

If Mrs Vessels bases her decision solely on the weightings above, it seems that increasing Autonomy would have a net positive effect on Intrinsic Motivation at SCEW, even assuming performance contingent incentives are in play. With a positive score of 6 (38 vs. -32) the effect is however not overbearing. The positive effects are muted by employees being exposed to risk and uncertainties, especially in light of the assumption of a form of performance pay. Table F-6 gives Mrs Vessel a good idea of how the negatives can be mitigated, and how the positives can be capitalised upon.

1E: Designing a Performance Bonus Plan (Specifying the FIMs with Link Model FIM→PIC)

If Mrs Vessel wants to design a Performance Bonus she should take Link Model FIM→PIC into consideration when specifying the features of the Performance Bonus. While the DSS does not strictly prompt the use of a Performance Bonus, the approach seems sensible as:

- In "1B: Analysing Prospective Incentive Mechanisms" is was seen that Performance Bonuses, Gainsharing, Merit Pay, Efficiency Wages, and Recognition are appropriate Incentive Mechanisms in this situation.
  - Performance Bonuses (including Gainsharing) and Merit Pay were deemed better options than Efficiency Wages and Recognition Plans as performance contingent extrinsic motivators.
  - Performance Bonuses are less expensive than Merit Pay as they have to be re-earned each year.
  - Gainsharing is a sub category of Performance Bonuses (there is thus not need to place this restriction on the Performance Bonus prior to designing it.
- "1C: PIC12 - Intrinsic Motivation" suggests that Intrinsic Motivation is healthy, there are however no pertinent extrinsic motivators.

As described in Incentive Mechanism #2 (IM2), and in more detail alongside Cascading Effects Model #2 (CEM2), Performance Bonuses can vary considerably. The basic restrictions are that it is a once-off bonus paid in addition to base pay, and is performance contingent. Mrs Vessel can consult Link Model IM–FIM to see what a typical Feature of Incentive Mechanisms (FIM) configuration for IM2 would look like, and then use Link Model FIM→PIC to understand how a specific configuration would interact with the PICs. This process is discussed for each FIM in SCEW's setting below.

1E1: Performance Measures (FIM1)

As per link IM–FIM5 (refer to the definition of IM2 or CEM2) the performance measures for Performance Bonuses are not specified, they can be objective, subjective, or a combination. FIM1 has four links with the PICs in Link Model FIM→PIC as seen in Figure F-11. Consulting the links yields the following insights in SCEW's situation:

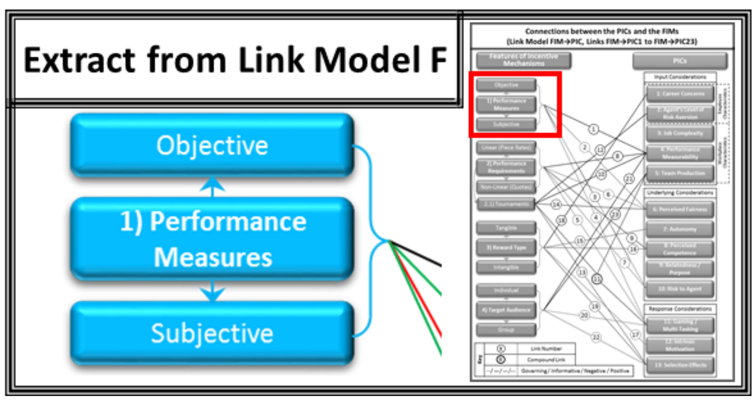


Figure F-11: FIM1 has four links to the PICs

Table F-8: Considering the links between FIM1 and the PICs

(Link) PIC	Discussion*	Conclusion
(FIM→PIC1) PIC4: Performance Measurability	FIM→PIC1 – [**Good Performance Measurability allows the use of objective performance measures while poor Performance Measurability suggests the use of subjective performance measures**: Objective measures are dependent on the availability and comprehensiveness of quantitative indicators. In the absence of comprehensive quantitative indicators subjective measures can be used. As an example "complex jobs [as per link PIC↔PIC12] will typically not be evaluated through explicit contracts" (Prendergast, 1999, p. 9).] The artisans' performance cannot be comprehensively measured with objective measures. While some productivity or quality indicators may be designed, the variability and complexity of the tasks present various measurement challenges. This typically suggests a greater focus on subjective measures.	Focus more on Subjective Measures.
(FIM→PIC2) PIC6: Perceived Fairness	The more subjective the performance measures, the bigger the danger to Perceived Fairness. This effect is stronger in cases where the firm has an incentive to underreport to save wages. SCEW should thus use objective measures where possible to alleviate fairness concerns.	Use Objective Measures where possible to alleviate fairness concerns.
(FIM→PIC3) PIC10: Risk to Agent	Common risks artisans are exposed to due to objective measures are not expected to be great, conversely there is a risk of the firm underreporting or reneging with the use of subjective measures.	Lean towards objective measures to alleviate fairness concerns.
(FIM→PIC4) PIC11: Gaming/ Multitasking	As quality objective measures are limited there is a significant scope for effort diversion, exploitation of classification rules, and timing distortions. Subjective measures are thus preferred, even though employees typically game this to some degree by wasting time currying favour instead of optimising actual performance.	Focus on Subjective Measures, at the cost of incentivising artisans to waste time currying favour.

*The information contained in the links is not included here for brevity's sake, it can be found in the database. This excludes link FIM→PIC1 in row 1 to demonstrate how the link and discussion fit together.

In summary performance measures would focus on subjective measures, even though this incentivises artisans to waste time currying favour instead of optimising actual performance. Objective measures should be used where possible to alleviate fairness concerns. If objective performance measures can be identified that does not have a great risk of stimulating Gaming/Multitasking they would be preferable.

1E2: Performance Requirements (FIM2)

As per link IM–FIM6 (refer to the definition of IM2 or CEM2) the performance requirements for Performance Bonuses are not specified, any combination of linear and non-linear requirements can be used. As per IM–FIM7 tournaments are not typically used however. FIM2 has five links with the PICs in Link Model FIM→PIC as seen in Figure F-12. Consulting the links yields the following insights in SCEW's situation:

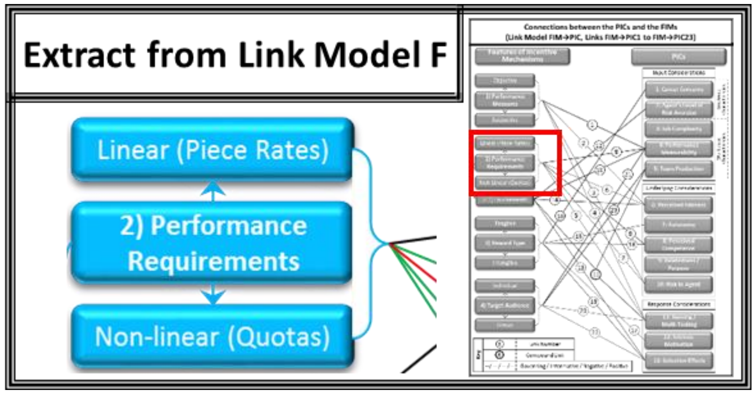


Figure F-12: FIM2 has five links to the PICs

Table F-9: Considering the links between FIM2 and the PICs

(Link) PIC	Discussion*	Conclusion
(FIM→PIC8) PIC4: Performance Measurability	Artisans do not carry out 'simple' jobs, comprehensive objective performance measures are not available. Perfect linear schemes, such as Piece Rates, are thus not suitable.	Perfectly linear schemes are not suitable.
(FIM→PIC6) PIC6: Perceived Fairness	FIM→PIC6 – [**The level of Perceived Fairness typically increases as the linearity of an incentive plan's performance measures increase**: One of the advantages of linear schemes is their simplicity (Dixit, 2002). This allows a high level of transparency which "affects an agent's perception of fairness" (Gagne & Deci, 2005, p. 354). Conversely non-linear incentive plans tend to become more complicated and can lead to lower levels of perceived transparency and introduce trust issues. Employee who just miss a quota for example may experience not receiving a reward as unfair.] The less linear the performance requirements, the bigger the danger to Perceived Fairness. Especially in cases where employees just miss some quota, and receive no reward for their efforts. Simplicity and transparency improves perceptions of fairness.	Linear requirements should be used where possible, and simplicity and transparency maximised.
(FIM→PIC9) PIC8: Perceived Competence	Where non-linear requirements are used care must be taken to set reasonable targets, otherwise negative competency signals are sent out.	Design targets, if used, with competency signals in mind.
(FIM→PIC7) PIC10: Risk to Agent	As the use of non-linear incentives expose artisans to risk, non-linear plans should be used where appropriate.	Use liner schemes to reduce Risk to Agent where possible.
(FIM→PIC5) PIC11: Gaming/ Multitasking	Using non-liner schemes provides many opportunities for gaming, especially in light of the difficulty of measuring artisans' performance.	Use linear schemes where possible to reduce the danger of gaming.

*The information contained in the links is not included here for brevity's sake, it can be found in the database. This excludes link FIM→PIC6 in row 2 to demonstrate how the link and discussion fit together.

In summary a mixture of linear and non-linear performance requirements are suggested. A perfectly linear scheme is not possible with the state of Performance Measurability at SCEW, but non-linear requirements are susceptible to gaming, exposes artisans to risks, can send negative competency signals, and have a negative effect on Perceived Fairness. The dangers with non-linear schemes can be mitigated if some linear aspects are incorporated.

1E3: Reward Type (FIM3)

As per link IM–FIM8 (refer to the definition of IM2 or CEM2) the reward for Performance Bonuses is typically monetary and in addition to base pay. FIM3 has five links with the PICs in Link Model FIM→PIC as seen in Figure F-13. Consulting the links yields the following insights in SCEW's situation:

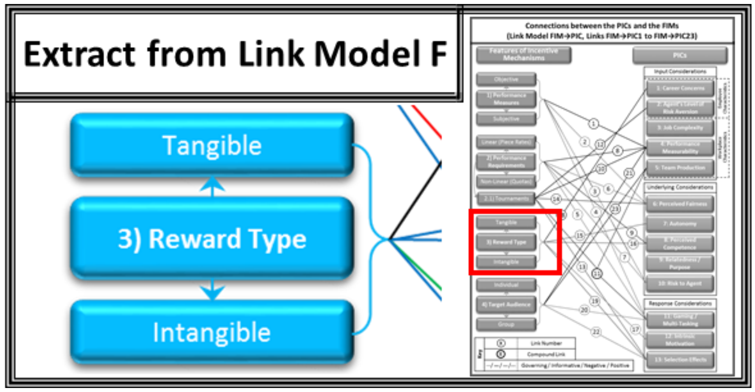


Figure F-13: FIM3 has five links to the PICs

Table F-10: Considering the links between FIM3 and the PICs

(Link) PIC	Discussion*	Conclusion
(FIM→PIC18) PIC1: Career Concerns	Artisans at SCEW are not expected to have grandiose Career Concerns that allow the use of long-term incentives instead of short term incentives with a clear line of sight.	Tangible rewards such as bonuses are suitable for the artisans at SCEW.
(FIM→PIC15) PIC7: Autonomy	The intangible reward 'Autonomy', as a performance contingent Incentive Mechanisms, is outside the scope as described by link IM–FIM8.	Not applicable.
(FIM→PIC16) PIC8: Perceived Competence	FIM→PIC16 – [**Recognition can be used as an intangible reward to increase Perceived Competence**: The extrinsic reward IM5.1 (Positive Feedback) typically results in increased levels of Perceived Competence.] The tangible reward Recognition, is not applicable to performance contingent bonuses.	Not applicable.
(FIM→PIC17) PIC12: Intrinsic Motivation	This link notes the crowding out effect. It is thus noted that when extrinsic incentives, tangible rewards, become very prominent, they tend to diminish intrinsic incentives.	Note the crowding out effect.
(FIM→PIC19) PIC13: Selection Effects	Selection Effects for individuals who value intangible rewards or are more focused on long-term rewards will not be strong. In SCEW's current situation Selection Effects are however not a major concern.	Not applicable.

*The information contained in the links is not included here for brevity's sake, it can be found in the database. This excludes link FIM→PIC16 in row 3 to demonstrate how the link and discussion fit together.

In summary a monetary reward in addition to base pay is a suitable type of reward for Performance Bonuses for the artisans at SCEW. There is however an adverse effect on Intrinsic Motivation as per the crowding out effect.

1E4: Target Audience (FIM4)

As per link IM–FIM9 (refer to the definition of IM2 or CEM2) the target audience for Performance Bonuses is not specified, it can be applied on an individual or group bases. FIM4 has four links with the PICs in Link Model FIM→PIC as seen in Figure F-14. Consulting the links yields the following insights in SCEW's situation:

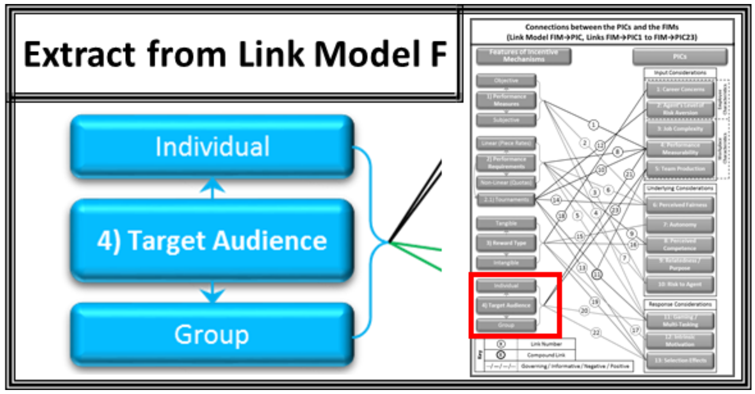


Figure F-14: FIM4 has four links to the PICs

Table F-11: Considering the links between FIM4 and the PICs

(Link) PIC	Discussion*		Conclusion
(FIM→PIC21) PIC4: Performance Measurability	Artisans at SCEW do not carry out 'simple' jobs, comprehensive objective performance measures are not available. Team based incentives are thus useful for mutual monitoring and positive peer pressure.		Team based incentives can be used to compensate for difficulties with performance measures.
(FIM→PIC23) PIC5: Team Production	While limited, there is a degree of task interdepended in the workshop. In light of this partial Team Production setting group incentives should be considered.		The degree of Team Production suggests some use of group incentives.
(FIM→PIC20) PIC11: Gaming/ Multitasking	FIM→PIC20a	Team incentives introduces the free-rider problem. There is some danger of free riding in the workshop, though the scope for it is limited.	A mixture of team based and individual incentives is suggested as there is a moderate degree of Task Interdependence.
	FIM→PIC20b	The artisans' productivities does vary, the danger of Team Production flattening productivity should be taken into account. This can be controlled by using a mixture of team and individual incentives.	
	FIM→PIC20c	Individual incentives can harm the cooperation in the worship. While there is some danger of this at SCEW the scope is limited. Again a mixture of team and individual incentives would reduce this danger.	
(FIM→PIC22) PIC13: Selection Effects	FIM→PIC22 – [**Moving from team based to individual incentives typically attracts higher performing employees**: Incentive pay affects the supply of workers, namely when workers or managers are offered incentive pay, they self-select into jobs where they expect their compensation to be higher (Bandiera, Barankay, & Rasul, 2007). "This means that group-based pay may also have unfavorable sorting effects, causing the highest performers to choose alternative opportunities where individual results will be rewarded more heavily" (Rynes, Gerhart, & Parks, 2005, p. 585).]		Not applicable.

	Individual incentives would result in better Selection Effects. In SCEW's current situation Selection Effects are however not a major concern.	

*The information contained in the links is not included here for brevity's sake, it can be found in the database. This excludes link FIM→PIC22 in row 4 to demonstrate how the link and discussion fit together.

In summary the target audience should be a mixture group and individual incentives. The Team Production setting leads a need for group incentives, yet the relatively low level of Task Interdependence prompts the use of individual incentives.

Appendix F.1.3) Review – HICS1

Table 17-1 discusses what aspects of the DSS was demonstrated, and how this improves decision-making in each subsection of Appendix F.1:

Table 17-1: Review of HICS1 – SCEW.

Section	Goal	What aspects of the DSS was demonstrated	How decision-making is improved
1A1	• Identify what type an Incentive Mechanism is.	• Node N2 briefly consulted. • CEM2 and CEM5 used to quickly compare two types of IMs.	• An IM can be classified, and an overview can be found, with ease.
1A2 & 1A3 & 1A4	• Ascertain the considerations (threats and opportunities) for two specific mechanisms. • Compare the mechanisms.	• CEM2/CEM5 to find the considerations (threats and opportunities) for two specific IM. • Link Model FIM→PIC used to find further considerations (threats and opportunities) for two specific IM configurations.	• Considerations (threats and opportunities) of specific IMs can be found with ease.
1B1	• Survey how appropriate the various IMs are in a specific setting.	• CEMs used to gauge how appropriate IMs are in a specific setting.	• Appropriate IMs can be identified with ease.
1C1	• Analyse the state of a PIC and identify Opportunities for Improvement (OFIs).	• ILM Segment 12 was used to ascertain how a PIC is affected by other PICs.	• The factors affecting a specific PIC can be identified with ease.
1D1	• Ascertain limitations.	• Node N1 description for PIC7 used.	• Overview of PIC readily available.
1D2	• Ascertain how a PIC can be improved.	• ILM Segment 7 used to find options.	• Ways of improving a PIC readily available.
1D3	• Understand the cascading effects of modifying a certain PIC.	• ILM Segment 7 used to find the PICs that are affected by a certain PIC, and to understand the links.	• Cascading effects for a specific PIC is readily available, as well as a description of each link.
1D4	• Understand all the links between two PICs.	• Link Model PIC↔PIC used to ascertain all links between two PICs. A part of the future mature UI is used instead of doing it manually.	• All the links between two PICs can be ascertained. This will be automatically available with a mature UI.
1E	• Select the appropriate FIMs for an IM.	• Link Model FIM→PIC is used to understand how each FIM affects the PICs.	• Custom IM design is made easier by understanding how each FIM affects the PICs.

Appendix F.2 – Hypothetical Illustrative Case Study 2 (HICS2)

This appendix contains the second Hypothetical Illustrative Case Study (HICS2 as discussed in Chapter 17.4); an overview of the characteristics and background is followed by an extensive narrative, and summarised in a review.

Appendix F.2.1) Characteristics and Background – HICS2

The parameters for HICS2 is as follows:

- User – Middle management / Training Program Co-ordinator.
- Target Audience – Professionals in Training (PITs) / Graduate Engineers.
- Industry – Mining/Manufacturing.
- Status Quo of Practices – Various (see below).
- Objective – Evaluate Current Practices and Make Recommendations.

This HICS considers a hypothetical company called LMC. LMC is a large mining company. The focus is on a group called Professionals in Training (PITs). The PITs are graduate engineers during their first few years at LMC. PITs are given various tasks and projects, and assigned to various projects and departments, usually on a short term rotating bases, to give them the exposure necessary to develop the needed skills and experience. Mr Thomas Rainer, a section engineer at LMC's flagship mine, acts as the training Co-ordinator for the PITs.

In terms of practices regarding employee incentives various schemes are in place. This includes:

- The company wide Profit-sharing bonus.
- Merit Pay.
- Recognition Plans.
- Promotions (seen as the primary motivator for PITs).

Mr T. Rainer has been tasked with making recommendations in terms of the practices regarding employee incentives for PITs.

Appendix F.2.2) Narrative – HICS2

An overview of the flow of the narrative for LMC is depicted in Figure 17-2:

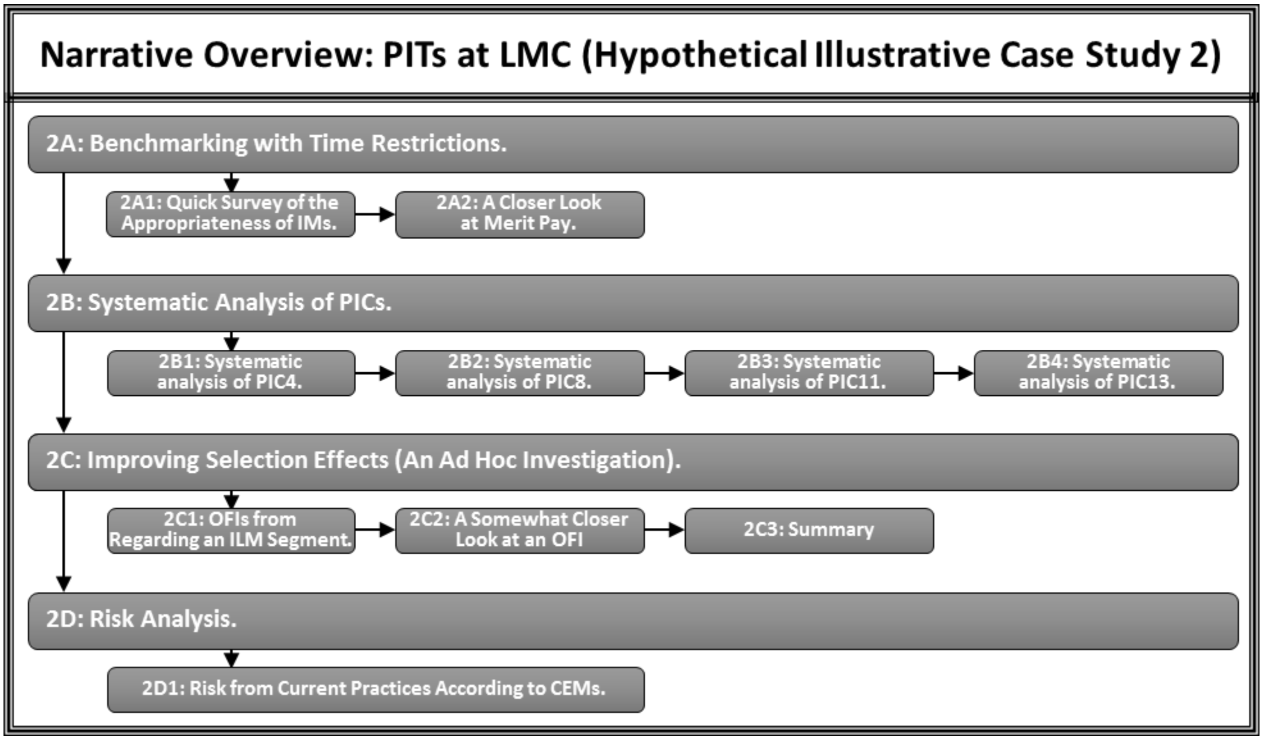


Figure 17-2: The flow of the narrative for PITs at LMC

A summary of what aspects of the DSS is demonstrated in each part can be found in the review subsection that follows the narrative. The narrative duplicates some of the material in HICS1, this is done to maintain HICS2's readability.

2A: Benchmarking with Time Restrictions

If Mr T. Rainer does not have a lot of time, but wants to do a quick analysis of the situation, the DSS can assist him in various ways. As a point of departure, Mr Rainer might want to quickly ascertain what Incentive Mechanisms (IMs) are typically appropriate in this situation, and compare them with current practices.

2A1: Quick Survey of the Appropriateness of IMs

One approach would be for Mr Rainer to start by surveying the appropriateness of the typical IMs. In this regard the Cascading Effects Models (CEMs) are useful, the informative links between PICs and IMs can be used to form a preliminary idea about the suitability of IMs. By looking at the left hand top of the CEMs, as shown in Figure F-8, for any 'informative' links between the IMs and PICs various inferences can be drawn. This is done by considering the relevant link against the current scenario. Table F-12contains a summary of the inferences that can be made in LMC's case:

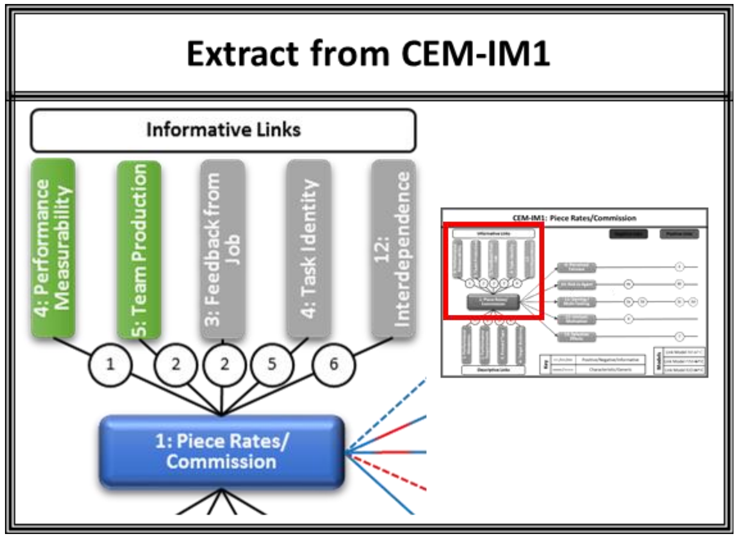


Figure F-8: Informative links on the CEMs, between PICs and the IM, can be used to gauge the suitability of an IM in a specific setting

Table F-12: IM's appropriateness for PITs at LMC as per the informative links on the CEMs

IMs	Link*	Discussion	Conclusion
IM1	IM→PIC1 – [**Piece Rates typically work well for 'simple' jobs where individual performance is easy to measure**: Due to Piece Rates typically awarding individuals 'per unit produced' it is noted that where "workers carry out 'simple' jobs, in the sense that aggregate measures of performance are available; it is for these jobs that piece rates are most likely to work" (Prendergast, 1999, p. 17). This corresponds with link FIM→PIC1 and FIM→PIC8.]	No simple performance measures are available for knowledge workers such as the PITs.	Very inappropriate
	IM→PIC2 – [**Piece Rates do not work well in a team setting**: Due to the focus on individual performance it is not surprising that piece rates "do not fit well with the team approach" (Noe, Hollenbeck, Gerhart, & Wright, 2006, p. 510). This is in line with link FIM→PIC23.]	PITs are rotated past various Team Production settings.	
IM2	-	-	-
IM2.1	IM→PIC9*	See discussion for IM→PIC10 below.	Very inappropriate
	IM→PIC10*	PITs are not specifically linked to a particular team or group for an extended period of time.	
IM2.2	-	-	-
IM3 IM3.1 IM3.2 IM3.3	IM→PIC16*	Information asymmetries are great and no good performance measures exist.	Moderately appropriate
IM4 IM4.1	-	-	-
IM4.2	IM→PIC30*	Performance is hard to measure.	Moderately appropriate
IM4.3	IM→PIC34*	PITs are typically young employees with long-term Career Concerns.	Moderately appropriate

IM5	IM→PIC36*	There are no noteworthy issues with Perceived Fairness at present.	Moderately appropriate
IM5.1	IM→PIC36*	There are no noteworthy issues with Perceived Fairness at present.	Moderately appropriate
	IM→PIC40*	Performance is hard to measure.	
IM6	-	-	-
IM7	IM→PIC50*	PITs typically have extensive Career Concerns.	Very appropriate
	IM→PIC51*	PITs are expected to typically have relatively low levels of risk aversion.	
IM7.1	IM→PIC50*	PITs typically have extensive Career Concerns.	Very appropriate

*The information contained in the links is not included here for brevity's sake, it can be found in the database. This excludes link IM→PIC1 and IM→PIC2 to demonstrate how the link and discussion columns fit together.

The appropriateness of the undefined IMs is gauged as follows:

- IM2: Performance Bonuses (Moderately inappropriate): IM2 is undefined by the CEMs due to the variety of Performance Bonuses. When considering IM2's Features of Incentive Mechanisms (FIMs) in this situation (IM–FIM5, 6, 7, 8, and 9) IM2 seems moderately inappropriate.
- IM2.2: Profit-sharing (Moderately appropriate): As Gainsharing and Performance Bonuses in general are inappropriate it leaves Profit-sharing as the last workable bonus option.
- IM4: Salary-based (Moderately appropriate): When considering IM4's FIMs (IM–FIM19 and 20) IM4 seems moderately inappropriate generically.
- IM4.1: Merit Pay (Moderately inappropriate): When considering IM4.1's FIMs (IM–FIM21, 24, 26, 19, and 20) IM4.1 seems moderately inappropriate, specifically in light of IM–FIM21 and IM–FIM24.
- IM6: Autonomy (Moderately inappropriate): Autonomy as an IM is dependent on performance measures (IM–FIM33 and IM–FIM34) which are limited for PITs. PITs are furthermore required to undergoing training and on the job learning which restricts the use of Autonomy as IM.

In summary, the IMs that seem appropriate for PITs in LMC's situation are:

- IM3: Employee Ownership based IMs.
- IM4.2: Efficiency Wages.
- IM4.3: Deferred Compensation.
- IM5: Recognition based IMs.
- IM7: Promotion based IMs (very appropriate).

If Mr T. Rainer has more time he can take a closer look at these IMs to determine their suitability. If various options exist on the ILM when a certain PIC is focused on, this list can also be taken into consideration. Note that, aside from Merit Pay, the existing practices seem appropriate after the initial survey. If promotion based IMs were not in place, a clear opportunity for improvement would have been highlighted.

2A2: A Closer Look at Merit Pay

Since Merit Pay is implemented but not specifically suggested by the quick survey, Mr T. Rainer might want to look into the appropriateness of Merit Pay. Another focus might be promotion based incentive plans, as they were deemed to be very appropriate. Even though they are used, they could be reviewed to ensure this is done as effectively as possible. Irrespective of what IM is to be examined in more detail, the CEMs are a useful tool. Mr T. Rainer hence turns to CEM-IM4, the CEM for Merit Pay. First consider the links to the PICs on the right hand of CEM-IM4.1 as shown in Figure F-15:

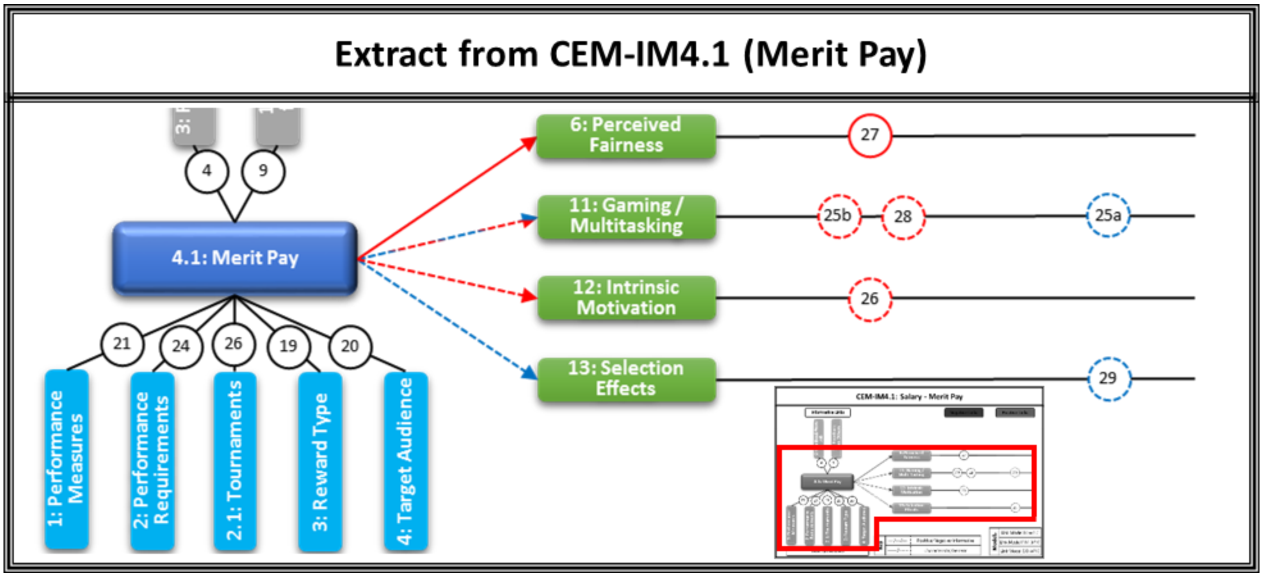


Figure F-15: The links between a specific IM and the PICs is shown on the right hand side of the CEMs

With a quick analysis the characteristic (solid line) and generic (dotted lines) links gives an overview of how the various PICs are typically affected, this is also verbally summarised alongside CEM-IM4 in the Model Base. When time is available for a more detailed analysis the generic links can be revaluated for the specific scenario, with all FIMs specified, through the FIM→PIC Links. This is done by stepping through the FIM→PIC Links and noting those that are applicable in this situation (this process is outlined in more detail in HICS1-1A2). With more time Mr T. Rainer can thus consider the characteristic link (IM→PIC27), and then step through the various FIMs as per Table F-13:

Table F-13: An analysis of a specific Merit Pay configuration as per CEM-IM4.1 and Link Model FIM→PIC

Characteristic Links		
Link*	**Discussion**	**Conclusion**
IM→PIC27 – [**Care has to be taken to ensure Merit Pay plans are perceived as fair and accurate:** Merit Pay plans can be complicated, multifaceted, and even incorporate aspects of tournaments. As per link FIM→PIC2, 6, and 14 Merit Pay is thus at risk of having a negative effect on Perceived Fairness. "If the performance measure is not perceived as being fair and accurate, the entire merit pay program can break down." (Noe, Hollenbeck, Gerhart, & Wright, 2006, p. 508).]	The difficulty of measuring PIT performance leads to a rating system heavily reliant on subjective measures. Further difficulties are presented with PITs rotating between various roles and jobs on a regular basis. Ensuring Perceived Fairness for PITs at LMC is thus expected to be challenging.	Perceived Fairness must be healthy for Merit Pay to be effective.
FIM1: Performance Measures A subjective rating of individual performance. This is comprised of ratings from individuals at the various departments or groups PITs are rotated to, and a rating from the PIT program co-ordinator based on observations and formal reports written by the PITs.		

Link*	Discussion	Conclusion
FIM→PIC1	Plan already conforms to observation made in this informative link.	-
	FIM→PIC2: Using more objective performance measures typically improves Perceived Fairness: Two of the factors affecting Perceived Fairness is transparency (Gagne & Deci, 2005, p. 354) and trust (Baker, Gibbons, & Murphy, 1994, p. 1127). "While an explicit contract can be enforced by a court, an implicit contract cannot, and so is vulnerable to reneging by the firm" (Baker, Gibbons, & Murphy, 1994, p. 1127). This is a concern as "Subjective performance evaluation procedures are subject to systematic cognitive biases in evaluation and might be considered as procedurally unfair as they cannot provide consistency and objectivity in the same way as objective evaluations do" (Weibel, Rost, & Osterloh, 2009, p. 405). As "there is a danger of the firm underreporting performance in order to save wages" (Prendergast, 1999, p. 37) Perceived Fairness concerns arise with subjective measures. As objective measures can be verified there is little subjectivity, trust issues are thus minimised and high levels of transparency can be facilitated. The subjective performance measure can have a negative effect on Perceived Fairness, especially if the outcome is not as the employees expect. Transparency, cognitive biases in evaluation, and the firm's motivation to under report contribute to this. In this case the individuals doing the evaluations is somewhat distanced from upper management, and the stake size is not considerable to the company. Trust issues are thus not expected to be large.	Somewhat Negative link with Perceived Fairness
FIM→PIC3	The subjective measures expose employees to some risk of employers underrating performance. As with FIM→PIC2 above this risk is not excessive in this scenario.	Somewhat Negative link with Risk to Agent
FIM→PIC4	Using subjective measures makes it difficult for employees to game the system as no measures can be easily manipulated.	Positive link with Gaming/ Multitasking
FIM→PIC4	Employees can manipulate the measurements by currying favour instead of optimising performance. This seems to be an especially relevant danger with PITs as their primary mandate is to be trained, and this in various settings by various individuals.	Very Negative link with Gaming/ Multitasking
	FIM2: Performance Requirements A rating score that is linear in nature. PITs are assigned a rating score to which Merit Pay is tied.	
Link*	**Discussion**	**Conclusion**
FIM→PIC5	The linear nature of the performance requirements limits the danger of gaming.	Positive Link with Gaming/ Multitasking
FIM→PIC6	While not perfectly linear the linear nature of the rating system typically has a positive effect on Perceived Fairness.	Positive link with Perceived Fairness
	FIM→PIC7: The level of Risk to Agent typically increases as the linearity of an incentive plan's performance measures decreases: The step function nature of non-linear incentive plans puts the agent at risk of not receiving a reward for effort exerted. Linear incentive plans do not expose agents to the same level of risk in this regard. The linear nature of the rating system does not expose employees to a situation where they exert effort and just miss out on reaching some target or milestone.	Positive link with Risk to Agent
FIM→PIC8	Plan already conforms to observation made in this informative link.	-

FIM→PIC9	As performance-based incentives serves as competency signals they can be used to improve Perceived Competence. With a subjective system that is not overly transparent care can be taken to send the appropriate signals.	Positive link with Perceived Competence
FIM2.1: Tournaments Ratings between PITs are not used for Merit Pay purposes.		
Link*	**Discussion**	**Conclusion**
FIM→PIC10 to FIM→PIC14	Not applicable as the tournament approach is not used.	-
FIM3: Reward Type A Salary increase.		
Link*	**Discussion**	**Conclusion**
FIM→PIC15	Not applicable for Merit Pay	-
FIM→PIC16	Not directly applicable for Merit Pay, see FIM→PIC9 however.	-
FIM→PIC17	By using a tangible reward as an extrinsic motivator there can be a crowding out effect of Intrinsic Motivation. Since the reward is a slight increase in Salary, as opposed to a considerable direct tangible reward, the effects are expected to be somewhat muted.	Somewhat negative link with Intrinsic Motivation
FIM→PIC18: An employee's Career Concerns determines what type of reward the employee values: Ambitious or young employees are more likely to be concerned about the effects of current performance on future compensation; they are likely to "exert effort not just to maximize current pay but also to affect the perceptions of others" (Prendergast, 1999, p. 51). It follows that Incentive Mechanisms like the opportunity for promotion, Recognition and visibility, and reputation concerns would be specifically valued.	Since the PITs are young graduates looking to further their careers FIM→PIC18 suggests that other types of IMs, such as Promotions, may be more effective.	Merit Pay is not expected to be the most effective type of incentive.
FIM→PIC19	No considerable effect expected.	-
FIM4: Target Audience All PITs, however independently assessed.		
Link*	**Discussion**	**Conclusion**
FIM→PIC20a	The individual focus annuls the free-rider problem.	Somewhat positive link with Gaming/ Multitasking
FIM→PIC20b	Flattening productivity is not a concern with an individual focus.	
FIM→PIC20c	The individual focus has a negative effect on cooperation. This is not a concern as PITs have little Task Interdependence.	
FIM→PIC21	Mutual monitoring is not applicable with limited Task Interdependence.	-
FIM→PIC22	The focus on individual performance attracts high performers.	Somewhat positive link with Selection Effects
FIM→PIC23: The balance between individual and group incentives should be aligned with Team Production considerations: Incentive plans should enhance situations where "Individuals will perform actions for their team that they would be unwilling to perform strictly for themselves" (Babcock, Bedard, Charnes, Hartman, & Royer, 2011, p. 26) and be sensitive to areas where individual incentives may cause employees to be "unlikely to help their competitors in need" (Prendergast, 1999, p. 35).	Plan already conforms to observation made in this informative link.	-

*The information contained in the links is not included here for brevity's sake, it can be found in the database. This excludes link IM→PIC27, FIM→PIC2, FIM→PIC7, FIM→PIC18, and FIM→PIC23 to demonstrate how the link and discussion columns fit together.

The conclusion column contains 13 entries. They are easier to internalise if summarised according to PICs as on Table F-14:

Table F-14: A summary of the considerations with Merit Pay at LMC for PITs

Additional notes from informative links: The Salary increase provided by Merit Pay is not expected to be the most effective type of incentive for PITs at LMC (FIM→PIC18). It is further noted that Perceived Fairness must be healthy for Merit Pay to be effective (IM→PIC27).		
PIC	**Considerations**	**Summary**
PIC6: Perceived Fairness	• FIM→PIC2 - Somewhat negatively affected due to subjective measures. • FIM→PIC6 - Positively affected due to linearity.	Neutral
PIC8: Perceived Competence	• FIM→PIC9 - Positively affected due to existence and controllability of competency signals.	Positive
PIC10: Risk to Agent	• FIM→PIC3 - Somewhat negatively affected due to risk of underreporting. • FIM→PIC7 - Positively affected due to linearity.	Neutral
PIC11: Gaming/Multitasking	• FIM→PIC4 - Very negatively affected as the situation is vulnerable to employee wasting time currying favour. • FIM→PIC4 - Positively affected as no objective measures are used which can be manipulated. • FIM→PIC5 - Positively affected due to linearity. • FIM→PIC20 – Somewhat positively affected as free-rider problem is mitigated. Discussion: While opportunities for gaming is limited by FIM→PIC4, 5, and 20, there is still a considerable threat of employees wasting time currying favour.	Negative
PIC12: Intrinsic Motivation	• FIM→PIC17 - Somewhat negatively affected due to tangible reward stimulating the crowding out effect.	Somewhat negative
PIC13: Selection Effects	• FIM→PIC21 - Positively affected due to individual rewards.	Somewhat positive

This exercise helps Mr T. Rainer to determine whether there is a net benefit to using Merit Pay or not, by making him aware of certain considerations in addition to the standard motivational effect vs. implementation costs consideration. Mr T. Rainer can now decide whether the motivating effect and improvement to goal alignment, being able to positively affect Perceived Competence, and the slight positive Selection Effects outweighs the cost to implement (in terms of both Salary increases and time/effort costs to administer), incentive for Gaming/Multitasking through currying favour, and the slight negative effect on Intrinsic Motivation. This decision is made while keeping in mind that Merit Pay is not expected to be the most effective type of incentive for PITs at LMC (2A1) and that a healthy level of Perceived Fairness is required for Merit Pay to function properly (IM→PIC27).

2B: Systematic Analysis of PICs

Mr T. Rainer has been tasked with making recommendations in terms of the practices regarding employee incentives for the Professionals in Training (PITs). One way to do this would be to identify Opportunities for Improvement (OFIs) and to gauge the state of each of the PICs (gauging the state is only applicable to underlying and response considerations). Attention can then be paid to unhealthy PICs, and OFI can be acted upon. Without considerable time constrictions Mr T. Rainer can conduct a systematic analysis of the practices regarding PIT incentives at LMC by stepping through the PICs. The Integrated Links Model (ILM) would help Mr T. Rainer to see what links are tied to each PIC. These models show:

- PICs linked to the focus PIC, including the type and description of the link.
- FIMs linked to the focus PIC, including the type and description of the link.
- Elements of Job Design (EJD) that can be used to influence the focus PIC, including the type and description of the link.
- Incentive Mechanisms (IMs) that affect the focus PIC, including the type and description of the link.

It must be kept in mind that making changes has cascading effects which cannot be ignored. Considering the first-degree links in this manner is however still a useful way of gauging a PIC's health and of identifying OFIs.

The analysis follows a cyclic process for each PIC. Each link is considered for OFIs, and its health is gauged. Note that the arrows pointing away from the focus PIC, towards the PICs influenced by the focus PIC, is not considered when gauging the health of the focus PIC. They are still considered to identify OFIs. Note that this is in the current setting where LMC uses Profit-sharing, Merit Pay, Recognition Plans, and Promotions. This demonstration will not run through all 13 PICs. Considering four PICs, one of each of the types of PICs (input-job/input-employee/underlying/response considerations), provides a sufficient demonstration.

2B1: PIC1 – Career Concerns

Career concern is an input consideration that looks at the employee(s). It follows that the OFIs are of more interest than the state of the PIC as the employee's Career Concerns are set. Mr T. Rainer can find the links surrounding Career Concerns on ILM-Segment 1, as shown in Figure F-16:

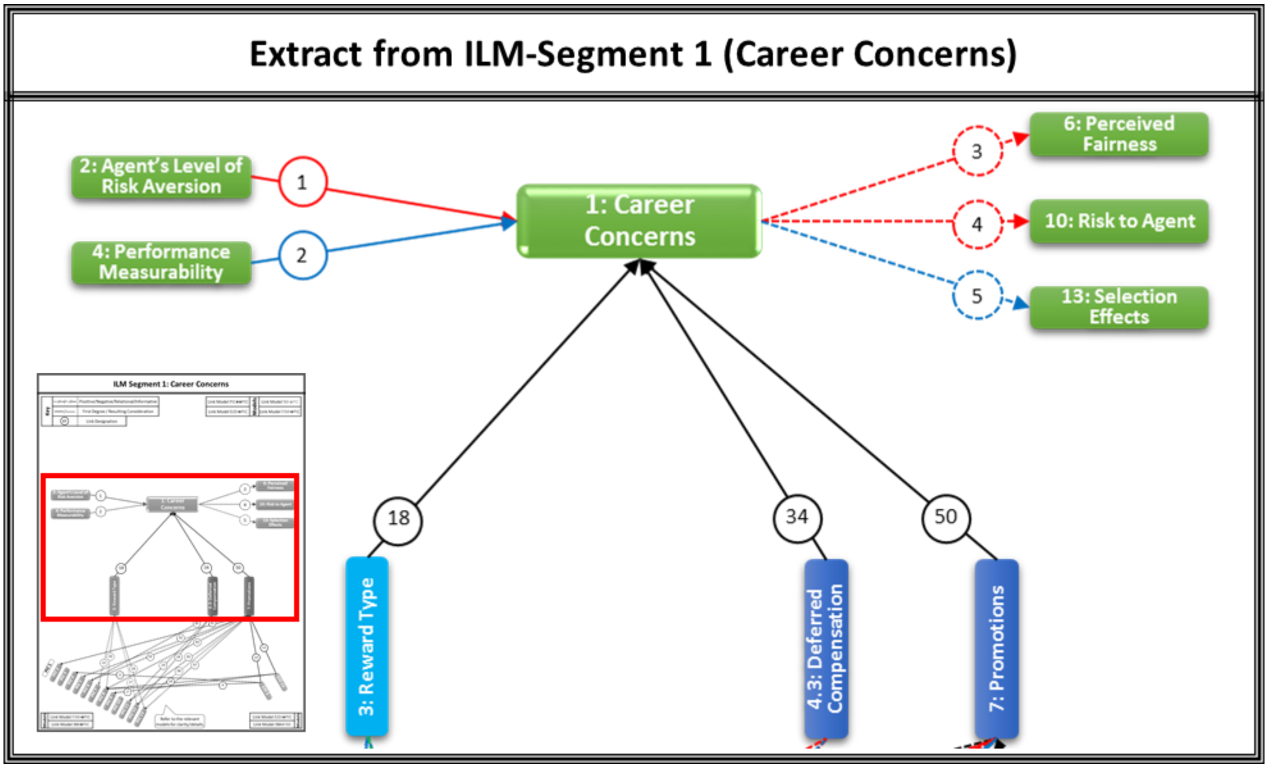


Figure F-16: The links surrounding Career Concerns

Each of the links can now be considered in turn. Table F-15 shows the discussion surrounding each link, the degree of each OFI, and highlights any relevant notes:

Table F-15: A closer look at the links surrounding Career Concerns at LMC for PITs

PIC↔PIC Links (PICs affecting the focus PIC – Career Concerns)			**OFI (0-4)**
PIC	**Link***	**Discussion**	• **Notes**
Agent's Level of Risk Aversion	PIC↔PIC1a – [**The higher an employee's level or risk aversion the higher the cost of Career Concerns as a means of motivation becomes:** Motivating employees through Career Concerns introduces a lag time between effort exerted and reward, hence uncertainty enters the decision-making process of employees (unexpected events may occur resulting in the reward not obtained). "This problem implies that the risk attitude of employees will be an important condition for the success or failure of career enhancement" (Lambooij, Flache, & Siegers, 2009, p. 308).]	PITs are not expected to be overly risk averse, but are expected to have strong long-term Career Concerns. LMC makes use of this opportunity primarily with Promotions and career opportunities for PITs as per link FIM→PIC18 and IM→PIC50.	Minor (1) • Make use of strong Career Concerns.
Agent's Level of Risk Aversion	PIC↔PIC1b	PITs generically have a reputation to consider, while they may take some risks to prove themselves, it is not regarded as a significant hazard.	Minor (1)
Performance Measurability	PIC↔PIC2	While some Recognition based IMs are in place and reviews for Merit Pay purposes provides further in-company visibility, the PITs' high level of Career	Moderate (2)

		Concerns suggests that visibility could be further enhanced.	• Ensure good visibility for PITs.
IM→PIC Links (IMs linked to the focus PIC – Career Concerns)			**OFI (0-4)**
IM	**Link***	**Discussion**	**• Notes**
Deferred Compensation	IM→PIC34	Informative link (Does not generate OFIs)	-
Promotions	IM→PIC50	Informative link (Does not generate OFIs)	-
FIM→PIC Links (FIMs linked to the focus PIC – Career Concerns)			**OFI (0-4)**
FIM	**Link***	**Discussion**	**• Notes**
Reward Type	FIM→PIC18 – [**An employee's Career Concerns determines what type of reward the employee values:** Ambitious or young employees are more likely to be concerned about the effects of current performance on future compensation; they are likely to "exert effort not just to maximize current pay but also to affect the perceptions of others" (Prendergast, 1999, p. 51). It follows that Incentive Mechanisms like the opportunity for promotion, Recognition and visibility, and reputation concerns would be specifically valued.]	As PITs are expected to have strong long-term Career Concerns opportunity for promotion, Recognition and visibility, and reputation concerns would be specifically valued. The incentive practices at LMC for PITs is already tailored for this.	Minor (1) • FIM3 must be aligned with Career Concerns
PIC↔PIC Links (PICs affected by the focus PIC – Career Concerns)			**OFI (0-4)**
PIC	**Link***	**Discussion**	**• Notes**
Perceived Fairness	PIC↔PIC3 – [**Promotion practices can lower Perceived Fairness:** Career Concerns often function as an implicit incentive, there is thus no contract, and performance measurement is subjective. This provides transparency challenges that can lead to issues such as perceived favouritism. Care must be taken as practices surrounding Career Concerns touch on many factors that have been identified as having a bearing on Perceived Fairness, this includes; transparency, trust, reneging, favouritism, and degree of subjectivity.]	While the promotion practices remains subjective to a degree, the PIT program does what it can to maintain perceptions of fairness.	Minor (1)
Risk to Agent	PIC↔PIC4	While the PITs are exposed to some risk due to the lag time between effort exerted and reward received this is not a notable issue, especially not in light of PIC↔PIC1. PITs are typically promoted after 12-24 months at LMC.	Minor (1)
Selection Effects	PIC↔PIC5	The current practice and capacity of LMC to provide for Career Concerns helps to attract better employees.	Minor (1) • Providing for Career Concerns has positive Selection Effects

*The information contained in the links is not included here for brevity's sake, it can be found in the database. This excludes link PIC↔PIC1a, IM→PIC34, FIM→PIC18 and PIC↔PIC3 to demonstrate how the link and discussion columns fit together.

The notes emphasise that PIT's strong Career Concerns should be leveraged (PIC↔PIC1a) with the appropriate type of reward (FIM→PIC18). Good visibility should be provided for PITs (PIC↔PIC2). These practices lead to positive Selection Effects (PIC↔PIC5).

LMC's practices covers these considerations well. Table F-15 does not reveal any major OFIs, except perhaps providing more visibility to PITs. It may well be that LMC chooses not to improve external visibility for PITs for strategic reasons (it would be a waste of resources if a PIT leaves the company shortly after being trained).

2B2: PIC4 – Performance Measurability

Note: The information contained in the links is not included in 2B2 for brevity's sake, it can be found in the database. Refer to 2B1, Table F-15***,*** *for a demonstration of how the link and discussion columns fit together.*

Performance Measurability is an input consideration that looks at the workplace. It follows that the OFIs are of more interest than the state of the PIC as the workplace's Performance Measurability is mostly set. Mr T. Rainer can find the links surrounding Career Concerns on ILM-Segment 4, as shown in Figure F-17:

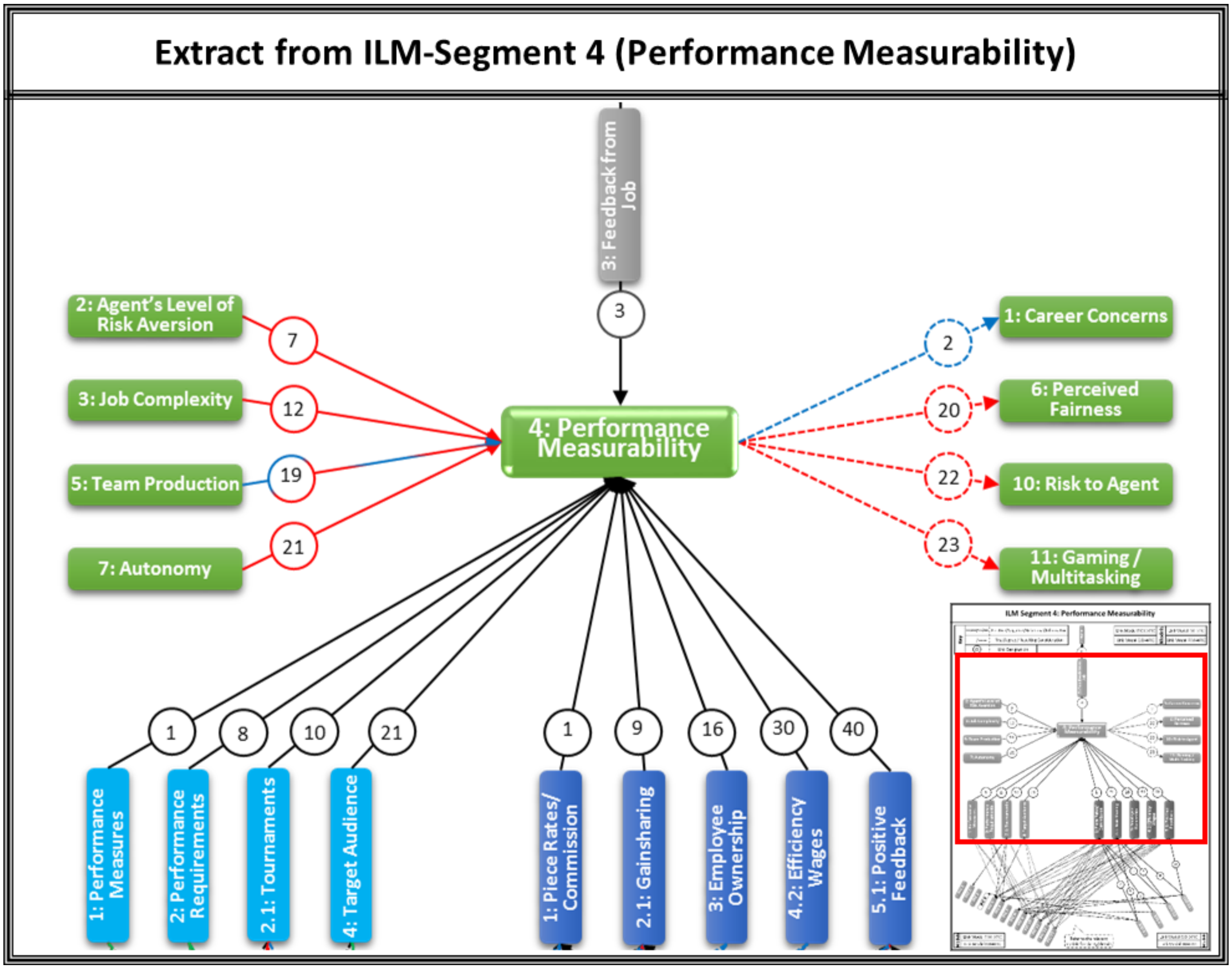


Figure F-17: The links surrounding Performance Measurability

Each of the links can now be considered in turn. Table F-16 shows the discussion surrounding each link, the degree of each OFI, and highlights any relevant notes:

Table F-16: A closer look at the links surrounding Performance Measurability at LMC for PITs

PIC↔PIC Links (PICs affecting the focus PIC – Performance Measurability)			OFI (0-4)
PIC	**Link***	**Discussion**	**• Notes**
Agent's Level of Risk Aversion	PIC↔PIC7	PITs are not expected to be overly risk averse. The performance measures for PITs are nevertheless relatively holistic due to their subjective nature.	Insignificant (0)
Job Complexity	PIC↔PIC12	The complexity of a PIT's job leads to difficulties with performance measures (PIC↔PIC12a), it follows that objective measures are not sufficient (PIC↔PIC12b). LMC makes use of mostly subjective measures for PITs.	Insignificant (0)
Team Production	PIC↔PIC19a	As PITs are not specifically part of team based incentives mutual monitoring options are muted.	Minor (1)
Team Production	PIC↔PIC19b	While PITs are not part of team based incentives they are rotated past Team Production settings. This makes the individual monitoring practices more challenging, yet the alternative is not an option.	Insignificant (0)

Autonomy	PIC↔PIC21	The high level of ambiguity and low routine of a PIT's job makes Performance Measurability difficult. The nature of the PIT program inhibits changes in this regard.	Insignificant (0)

IM→PIC Links (IMs linked to the focus PIC – Performance Measurability)			OFI (0-4) • Notes
IM	**Link***	**Discussion**	
Piece Rates/Commission	IM→PIC1	Informative link (Does not generate OFIs)	-
Gainsharing	IM→PIC9	Informative link (Does not generate OFIs)	-
Employee Ownership	IM→PIC16	Informative link (Does not generate OFIs)	-
Efficiency Wages	IM→PIC30	Informative link (Does not generate OFIs)	-
Positive Feedback	IM→PIC40	Informative link (Does not generate OFIs)	-

FIM→PIC Links (FIMs linked to the focus PIC – Performance Measurability)			OFI (0-4) • Notes
FIM	**Link***	**Discussion**	
Performance Measures	FIM→PIC1	The use of subjective measures is suggested, which is in line with the way PIT performance is measured at LMC.	Insignificant (0)
Performance Requirements	FIM→PIC8	While PIT's jobs do not allow pure linear schemes, some of LMC's plans have a degree of linearity, others do not.	Insignificant (0)
Tournaments	FIM→PIC10	For PITs relative performance is easier to measure than absolute performance, tournament approaches are thus suitable. This is part of the promotion process, where the best applicant among the PITs is selected for a specific job.	Minor (1)
Target Audience	FIM→PIC21	PITs' individual performance is hard to measure, yet mutual monitoring options are limited as per link PIC↔PIC19 above.	Minor (1)

EJD→PIC Links (EJD linked to the focus PIC – Performance Measurability)			OFI (0-4) • Notes
EJD	**Link***	**Discussion**	
Feedback from Job	EJD→PIC3	No notable room exists to design PITs' jobs so that they provide more performance feedback.	Minor (1)

PIC↔PIC Links (PICs affected by the focus PIC – Performance Measurability)			OFI (0-4) • Notes
PIC	**Link***	**Discussion**	
Career Concerns	PIC↔PIC2	While some Recognition based IMs are in place and reviews for Merit Pay purposes provides further in-company visibility, the PITs' high level of Career Concerns suggests that visibility could be further enhanced.	Moderate (2) • Ensure good visibility for PITs.
Perceived Fairness	PIC↔PIC20	Various incentives the PITs are involved with have subjective performance measures. This includes the Recognition Plans, Merit Pay, and most importantly Promotions. The setting does not allow for less subjective measures. Care has to be taken ensure the danger to Perceived Fairness is mitigated as much as possible by promoting transparency and building trust where possible.	Moderate (2) • Promote transparency and build trust.
Risk to Agent	PIC↔PIC22	As with link PIC↔PIC20, PITs' performance measures are largely subjective. This exposes employees to risks that the employee will renege or underrate performance. Little can be done to mitigate this perceived risk aside from systematically building trust.	Minor (1)
Gaming/ Multitasking	PIC↔PIC23	LMC's incentive plans seek to limit the opportunities for gaming where quantitative measures are involved, the focus on subjective measures with PITs however still poses a danger of gaming in terms of currying favour (personal manipulation rather than effective performance). This is especially relevant since PITs are rotated and assessed by various individuals. There might be room to ensure that objective measures balance out this danger.	Moderate (2) • Balance risk of currying favour with objective measures.

*Refer to the note at the start of 1B2.

A few significant OFIs were identified, each of them concerning PICs affected by the focus PIC. The notes emphasised that; visibility for PITs should be enhanced in light of the strong Career Concerns (PIC↔PIC2), danger to Perceived Fairness should be mitigated by promoting transparency and building trust (PIC↔PIC20), and the danger of currying favour instead of optimising performance should be mitigated with objective measures where possible (PIC↔PIC23).

Table F-16 does not reveal any major OFIs, except as discussed with the three notes above.

2B3: PIC8 – Perceived Competence

Note: The information contained in the links is not included in 2B3 for brevity's sake, it can be found in the database. Refer to 2B1, Table F-15***, for a demonstration of how the link and discussion columns fit together.***

Perceived Competence is an underlying consideration. It follows that in addition to identifying OFIs, the state of Perceived Competence can also be gauged. Mr T. Rainer can find the links surrounding Career Concerns on ILM-Segment 8, as shown in Figure F-18:

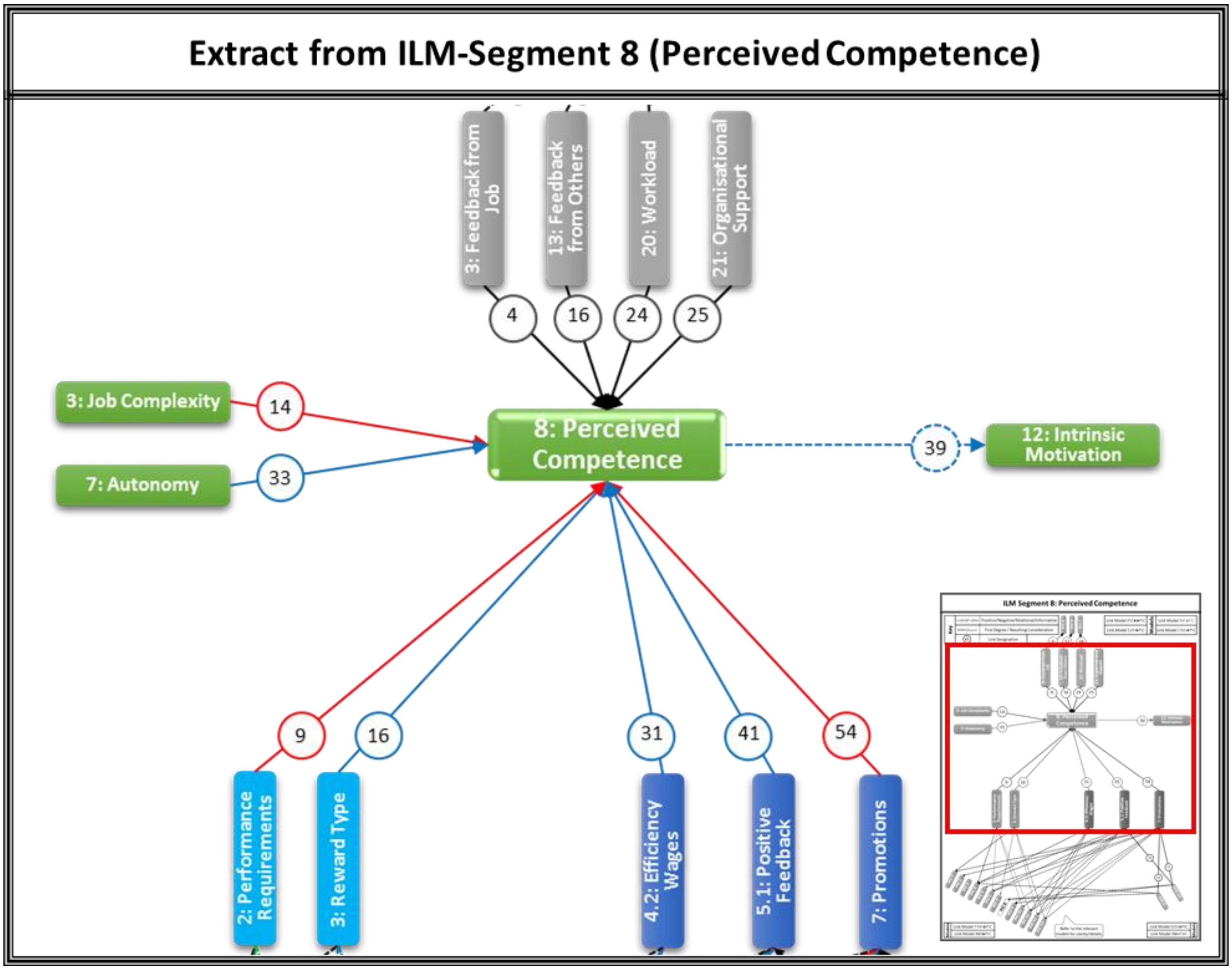


Figure F-18: The links surrounding Perceived Competence

Each of the links can now be considered in turn. Table F-17 shows the discussion surrounding each link, the rough state or health of each link, the degree of each OFI, and highlights any relevant notes:

Table F-17: A closer look at the links surrounding Perceived Competence at LMC for PITs

PIC↔PIC Links (PICs affecting the focus PIC – Perceived Competence)			**Link State (-3 to 3)**	**OFI (0-4) • Notes**
PIC	**Link***	**Discussion**		
Job Complexity	PIC↔PIC14	At LMC the PIT program is tailored to match the knowledge level of engineering graduates who comprise most of the PIT group.	Positive (2)	Minor (1)
Autonomy	PIC↔PIC33	While the PIT program is structured, it does leave PITs with enough Autonomy not experience a sense of internal assent regarding their behaviour.	Somewhat positive (1)	Minor (1)
IM→PIC Links (IMs linked to the focus PIC – Perceived Competence)			**Link State (-3 to 3)**	**OFI (0-4) • Notes**
IM	**Link***	**Discussion**		
Efficiency Wages	IM→PIC31	PITs are paid a competitive Salary verging on Efficiency Wages.	Positive (2)	Minor (1)
Positive Feedback	IM→PIC41	LMC does not have specific Positive Feedback mechanisms in place. Merit Pay evaluation and	Neutral (0)	Moderate (2)

		Recognition Plans do however act as tools to provide feedback.		
Promotions	IM→PIC54	Promotions serves as one of the major motivators for PITs. While PITs are typically promoted after 12-24 months, individuals who take longer to be promoted suffer damage to their level of Perceived Competence.	Negative (-2)	Moderate (2)
FIM→PIC Links (FIMs linked to the focus PIC – Perceived Competence)			**Link State (-3 to 3)**	**OFI (0-4) • Notes**
FIM	**Link***	**Discussion**		
Performance Requirements	FIM→PIC9	PIT are not exposed to typical quotas or milestones. The most extensive personal set of requirements, connected to Merit Pay, are linear in nature. Promotions can however be seen to rest on achieving some milestone, when this is not achieved Perceived Competence starts to be damaged after a time (see also link IM→PIC54 above).	Negative (-2)	Minor (1)
Reward Type	FIM→PIC16	See Positive Feedback as per link IM→PIC41 above.	-	-
EJD→PIC Links (EJD linked to the focus PIC – Perceived Competence)			**Link State (-3 to 3)**	**OFI (0-4) • Notes**
EJD	**Link***	**Discussion**		
Feedback from Job	EJD→PIC4	PIT's jobs does not inherently provide, nor can it be re-designed to provide, much physical performance feedback	Neutral (0)	Insignificant (0)
Feedback from Others	EJD→PIC16	The PIT program is designed in such a way that PITs receive Feedback from Others. Formally alongside Merit Pay and Recognition Plans, as well as from Mr T. Rainer.	Positive (2)	Moderate (2) • Mentors/ Co-Workers?
Workload	EJD→PIC24	The PIT program is designed to have a balanced Workload.	Positive (2)	Insignificant (0)
Organisational Support	EJD→PIC25	LMC has structures in place to support employees. Mr T. Rainer is specifically responsible to provide PITs with the required support.	Positive (2)	Minor (1)
PIC↔PIC Links (PICs affected by the focus PIC – Perceived Competence)				**OFI (0-4) • Notes**
PIC	**Link***	**Discussion**		
Intrinsic Motivation	PIC↔PIC39	This link does not reveal any OFIs, but shows that Perceived Competence has an effect on Intrinsic Motivation. If Intrinsic Motivation is focused on the OFIs in this table automatically becomes OFIs in relation to Intrinsic Motivation.		-

*Refer to the note at the start of 1B3.

A note points out that EJD13 (as per link EJD→PIC16) could be used to improved Perceived Competence, perhaps by designing PITs' jobs so that they have mentors at each rotation for example. Other OFIs noted by Table F-17 involves providing Positive Feedback (IM→PIC41) and controlling for damage done to Perceived Competence with Promotion plans (IM→PIC54). It might well be found that the damage done to Perceived Competence with Promotions is outweighed by other benefits.

The links between Perceived Competence and the other PICs suggests that the Perceived Competence of the PITs at LMC should be relatively healthy. While there is some danger of damage mainly from promotion practices (IM→PIC54 and FIM→PIC9), the other links are positive.

2B4: PIC11– Gaming/Multitasking

Note: The information contained in the links is not included in 2B4 for brevity's sake, it can be found in the database. Refer to 2B1, Table F-15**,** *for a demonstration of how the link and discussion columns fit together.*

Gaming/Multitasking is a response consideration. It follows that in addition to identifying OFIs, the state of Gaming/Multitasking can also be gauged. Mr T. Rainer can find the links surrounding Gaming/Multitasking on ILM-Segment 11, as shown in Figure F-19:

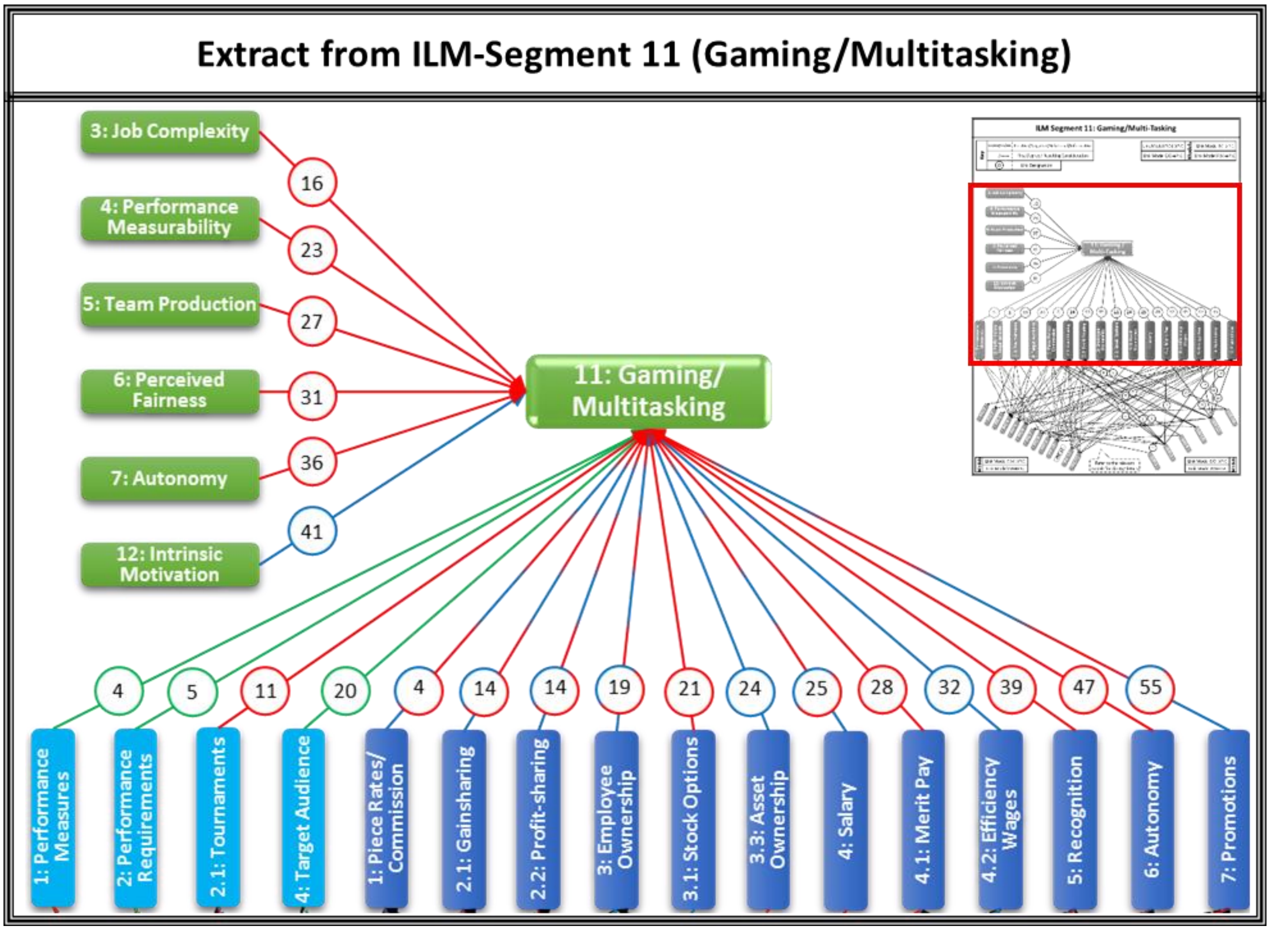


Figure F-19: The links surrounding Gaming/Multitasking

Each of the links can now be considered in turn. Table F-18 shows the discussion surrounding each link, the rough state or health of each link, the degree of each OFI, and highlights any relevant notes:

Table F-18: A closer look at the links surrounding Gaming/Multitasking at LMC for PITs

PIC↔PIC Links (PICs affecting the focus PIC – Gaming/Multitasking)			Link State (-3 to 3)	OFI (0-4) • Notes
PIC	**Link***	**Discussion**		
Job Complexity	PIC↔PIC16	This second-degree link works through Performance Measurability, see link PIC↔PIC23 below. Not much can be done to decrease the complexity of the PIT program.	-	Minor (1)

Performance Measurability	PIC↔PIC23	LMC's incentive plans seek to limit the opportunities for gaming where quantitative measures are involved, the focus on subjective measures with PITs however still poses a danger of gaming in terms of currying favour (personal manipulation rather than effective performance). This is especially relevant since PITs are rotated and assessed by various individuals. There might be room to ensure that objective measures balance out this danger.	Negative (-2)	Moderate (2) • Balance risk of currying favour with objective measures.
Team Production	PIC↔PIC27	This second-degree link works through Performance Measurability, see PIC↔PIC23 above. While PITs work individually they are rotated past team settings, this cannot be changed.	-	Insignificant (0)
Perceived Fairness	PIC↔PIC31	The transparency levels at LMC is limited through the use of subjective measures.	Somewhat Positive (1)	Minor (1)
Autonomy	PIC↔PIC36	This second-degree link works through Performance Measurability, see link PIC↔PIC23 above. PIT are granted considerable levels of Autonomy as necessitated by training purposes.	-	Minor (1)
Intrinsic Motivation	PIC↔PIC41	PITs generally have healthy levels of Intrinsic Motivation, this reduces the likelihood of gaming.	Positive (2)	Minor (1)
IM→PIC Links (IMs linked to the focus PIC – Gaming/Multitasking)**			**Link State (-3 to 3)**	**OFI (0-4)** • **Notes**
IM	**Link***	**Discussion**		
Piece Rates/ Commission	IM→PIC4	Deemed 'very inappropriate' in 2A1. Not used at present.	-	Insignificant (0)
Gainsharing	IM→PIC14	Deemed 'very inappropriate' in 2A1. Not used at present.	-	Minor (1)
Profit-sharing	IM→PIC14	Deemed 'moderately appropriate' in 2A1. LMC has a Profit-sharing plan. IM→PIC14a - PITs have no significant influence on the measures, IM→PIC14b - The effect Profit-sharing has on PITs will be handicapped by opportunities for social loafing, and IM→PIC14c - some positive effect on co-operation.	Neutral (0)	Minor (1)
Employee Ownership	IM→PIC19	Deemed 'moderately appropriate' in 2A1. No Ownership plans are in place. No high ownership options can be implemented for PITs.	-	Minor (1)
Stock Options	IM→PIC21	Deemed 'moderately appropriate' in 2A1. No Stock Options are in place for PITs.	-	Minor (1)
Asset Ownership	IM→PIC24	Deemed 'moderately appropriate' in 2A1. No Asset Ownership plans are in place. Significant Asset Ownership by PITs is not feasible.	-	Insignificant (0)
Salary	IM→PIC25	Deemed 'moderately appropriate' in 2A1. Merit Pay is a form of Salary-based incentives. See link IM→PIC28 below.	-	-
Merit Pay	IM→PIC28	Deemed 'moderately inappropriate' in 2A1. LMC has a Merit Pay plan for PITs. The negative effect on gaming stems for the subjective measures and will mainly be in the form of currying favour (see link PIC↔PIC23 above).	Somewhat Negative (-1)	Moderate (2)
Efficiency Wages	IM→PIC32	Deemed 'moderately appropriate' in 2A1. While Efficiency Wages is not formally practiced PITs	Positive (2)	Minor (1)

		receive a competitive Salary verging on Efficiency Wages. The likelihood of PITs engaging in gaming is thus reduced.		
Recognition	IM→PIC39	Deemed 'moderately appropriate' in 2A1. LMC has Recognition Plans in place. As with other plans this creates some incentive for PITs to engage in currying favour instead of optimising performance.	Somewhat Negative (-1)	Minor (1)
Autonomy	IM→PIC47	Deemed 'moderately inappropriate' in 2A1. Not used at present (not as an IM, PITs operate with a fair level of Autonomy as per link PIC↔PIC36 above).	-	Minor (1)
Promotions	IM→PIC55	Deemed 'very appropriate' in 2A1. It is perhaps the primary motivator for PITs. While link IM→PIC55a limits the effectiveness to all employee somewhat, the scope for Promotions make up for this as per link IM→PIC55b. For PITs link IM→PIC55c is not a concern and link IM→PIC55d is positive.	Very Positive (3)	Minor (1)
FIM→PIC Links (FIMs linked to the focus PIC – Gaming/Multitasking)			**Link State (-3 to 3)**	**OFI (0-4) • Notes**
FIM	**Link***	**Discussion**		
Performance Measures	FIM→PIC4	The reliance on subjective measures leads to a danger of PITs currying favour instead of optimising performance (see also link PIC↔PIC23 above).	Negative (-2)	Moderate (2) • Balance risk of currying favour with objective measures.
Performance Requirements	FIM→PIC5	PIT are not exposed to typical quotas or milestones. The most extensive personal set of requirements, connected to Merit Pay, are linear in nature. Promotions can however be seen to rest of achieving some milestone. The typical discounting, slacking, or timing manipulation forms of gaming are thus not a significant concern.	Neutral (0)	Minor (1)
Tournaments	FIM→PIC11	While the promotion based incentives makes use of tournaments the lack of Team Production concerns for PITs reduce the danger of harmful competitiveness.	Neutral (0)	Minor (1)
Target Audience	FIM→PIC20	The various incentives are targeted to different groups. Profit-sharing to the company as a whole, but Merit Pay, Recognition, and Promotions to PITs individually. FIM→PIC20a and FIM→PIC20b is thus not a major issue for PITs, nor is FIM→PIC20c as PITs have a relatively low level of Task Interdependence.	Neutral (0)	Minor (1)

*Refer to the note at the start of 1B4.

**In order to determine the suitability of a specific IM 2A2 can be repeated.

A note (repeated twice) points out that care should be taken to include objective measures where possible to balance the danger of employees currying favour instead of optimising performance. This Opportunity for Improvement (OFI) is mirrored in link FIM→PIC4, IM→PIC28, and PIC↔PIC23. Table F-18 does not reveal any other obvious OFIs.

The links between Gaming/Multitasking and the other PICs suggest that the state of PIC11, Gaming/Multitasking, is not unhealthy. There is a negative link with Performance Measurability (PIC↔PIC23) as the resulting performance measures, heavily reliant on subjective measures, prompt dysfunctional responses mainly in the form of currying favour instead of optimising performance. This danger is offset by expected healthy levels of Intrinsic Motivation (PIC↔PIC41), and further limited by relatively low levels of transparency due to the subjective measures (PIC↔PIC31).

2C: Improving Selection Effects (An Ad-Hoc Investigation)

Assume that LMC is concerned with the talent their Professionals in Training (PIT) program is drawing. If Mr T. Rainer is tasked with proposing options to improve Selection Effects the DSS could be used in various ways. This subsection demonstrates how the DSS could function in an ad-hoc manner. The systematic approach demonstrated in 2B could be followed if time restrictions are relaxed, and Opportunities for Improvement (OFIs) could then be analysed in more detail, perhaps in a similar manner as Merit Pay in 2A2.

2C1: OFIs from Regarding an ILM Segment

The easiest place for such an ad-hoc investigation to start to identify OFIs related to Selection Effects would be Integrated Links Model (ILM) Segment 13 as shown in Figure F-20:

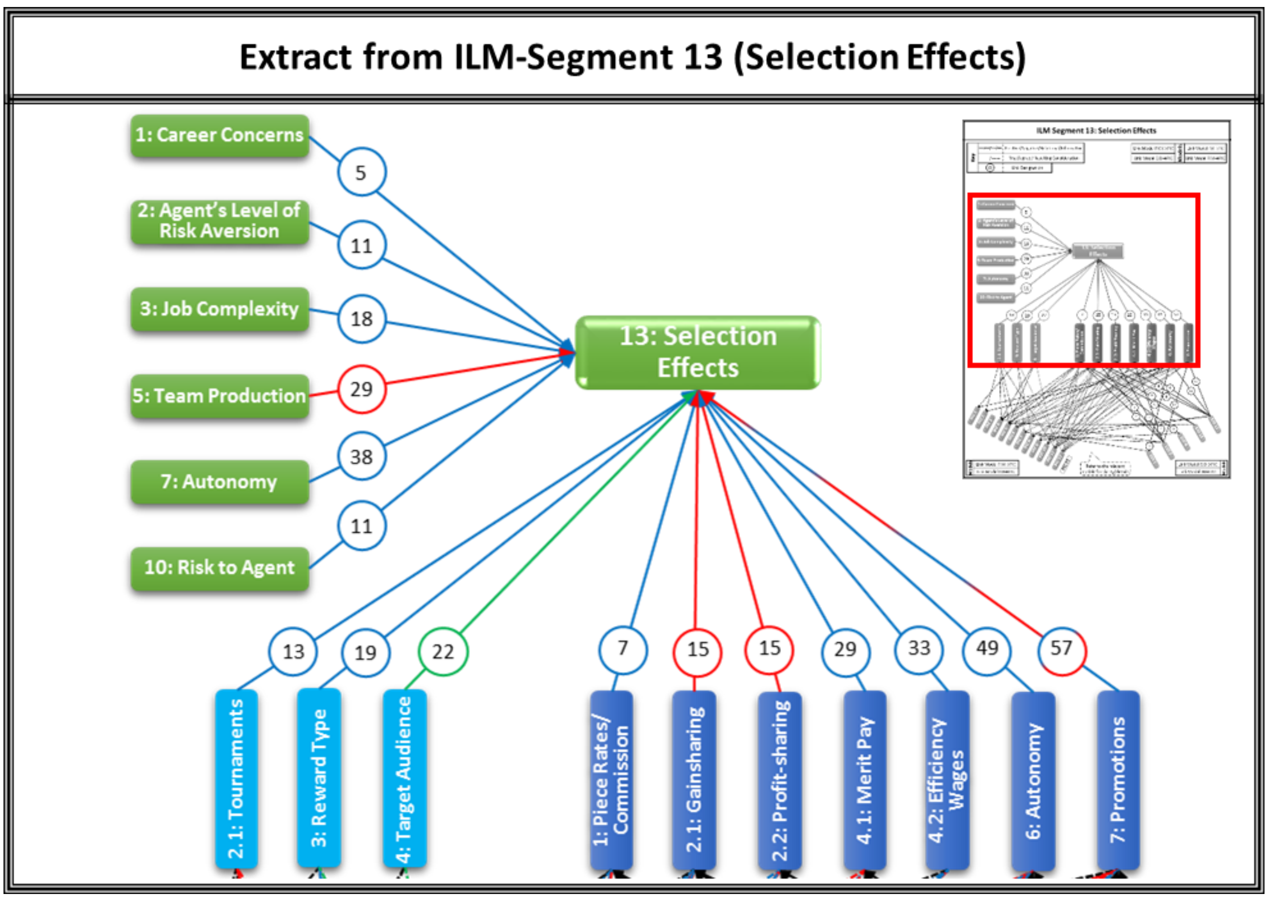


Figure F-20: The links surrounding Selection Effects

First consider the connections with the PICs. No OFIs become immediately clear. It is noted that Career Concerns must be accounted for (PIC↔PIC5), risk and risk preferences are not expected to dissuade top employees (PIC↔PIC11), Job Complexity is suited to PITs (PIC↔PIC18), Team Production considerations are not expected to have a considerable negative effect (PIC↔PIC29), and while more Autonomy might have a positive effect (PIC↔PIC38) the PIT program already allows as much Autonomy as is feasible.

Secondly the connections with the Features of Incentive Mechanisms (FIMs) are considered. While relevant factors are highlighted no new OFIs come to light. The Promotion based Incentive Mechanism (IM) already in place attempts to draw productive workers via a tournament setting (FIM→PIC13), the reward types are tailored for PITs with their high Career Concerns (FIM→PIC19), and the focus is on individual incentives as it typically attracts higher performing employees (FIM→PIC22).

Thirdly the focus moves to the connections between the IMs and the PICs. Here some OFIs are found. Broadly speaking OFIs can be in two forms; a negative link or danger (red lines) can be mitigated, or a positive link or opportunity (blue lines) can be improved or better capitalised upon:

- Negative links – PITs are not involved with Gainsharing but are included in the company wide Profit-sharing plan. While this is not expected to have a positive effect on Selection Effects, it should also not have a significant negative effect (IM→PIC15). Promotion practices can lead to a sub optimal resource allocation (IM→PIC57a). This is however not an issue with employees drawn to the PIT program. If a resource allocation issue arises it would be with the positions PITs are promoted to. While this issue is common with front-line employees and front-line managers it is not expected to be an issue here due to the nature and structure of the PIT program.
- Positive Links:
  - IM→PIC7 – Piece Rates are a good way of attracting more-able employees. Quickly considering Cascading Effects Model #1 (CEM-IM1) and specifically link IM→PIC1 (as done in 2A1) quickly reveal that Piece Rates are however not an appropriate IM for PITs at LMC.
  - IM→PIC29 – Merit Pay, with its focus on individual performance, typically has positive Selection Effects. Merit Pay is currently used and should thus not be removed (as discussed at the end of 2A2) if Selection Effects are wanting.
  - IM→PIC33 – Efficiency Wages has positive Selection Effects. While Efficiency Wages are not explicitly implemented PITs do receive a competitive Salary. Further investigation would be warranted to determine if this OFI is worth pursuing. See 2C2.
  - IM→PIC49 – Providing more Autonomy might have positive Selection Effects. It is however not feasible to increase the current levels of Autonomy for PITs at LMC.
  - IM→PIC57 – Promotions are attractive to high-performing employees, LMC already focuses on Promotions as the major incentive for PITs.

While various IMs have bearing on Selection Effects LMC's practices already mostly capitalises on them. The one OFI that was identified as worth investigating further is the use of Efficiency Wages.

2C2: Pros and Cons of a Specific Opportunity for Improvement (Efficiency Wages)

As a prospective OFI has been identified it can now be regarded more closely. Bear in mind that Mr T. Rainer is busy with a quick ad-hoc investigation. With more time a more detailed analysis could be undertaken as with Merit Pay in 2A2. The easiest way to discern if Efficiency Wages is appropriate, and to find the cascading effects or pros and cons would be to consider CEM-IM4.2 as shown in Figure 15-12:

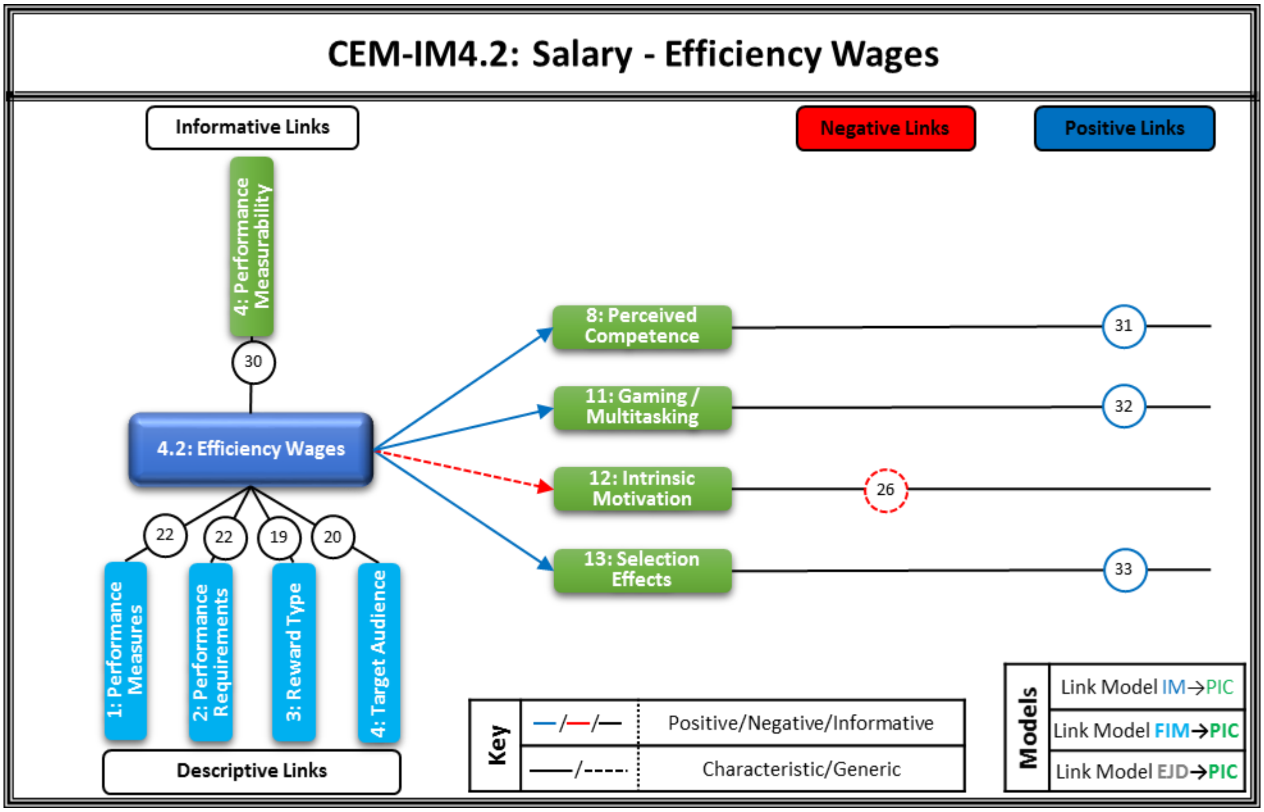


Figure 15-12: CEM-IM4.2: Salary - Efficiency Wages.

The informative links and descriptive links on the left can be used to gauge whether Efficiency Wages is appropriate in this setting. Link IM→PIC30 suggests that, as performance is hard to measure, Efficiency Wages is appropriate. While link IM–FIM20 and IM–FIM22 do not counter this, link IM–FIM19 must be considered in more detail. Link IM–FIM19 notes that Efficiency Wages is a Salary-based IM that involves "a practice of paying higher than standard market rates to increase a job's value to an employee". It is thus necessary to determine what market rates are, and what competitors are paying, to determine if an OFI exists. In this case LMC pays PITs competitive rates, but not explicitly higher than standard rates. There is thus room to intensify the use of Efficiency Wages.

The right hand side of Figure 15-12 serves as a summary of the Pros and Cons of using Efficiency Wages on the PICs. Here it is seen that aside from the positive effect on Selection Effects (IM→PIC33) there is also a positive effect on Perceived Competence (IM→PIC31) and Gaming/Multitasking (IM→PIC32). On the other hand there is however a prospective negative effect on Intrinsic Motivation (IM→PIC26), which is due to Efficiency Wages using extrinsic motivators (IM–FIM19), which can cause Intrinsic Motivation to be crowded out (FIM→PIC17).

2C3: Summary

LMC's practices aligns well with those proposed by the DSS to optimise Selection Effects. The most promising OFI is introducing, or magnifying, Efficiency Wages. A quick analysis suggests that Merit Pay is a suitable IM for PITs at LMC, and that the pros outweigh the cons, especially considering that the negative link or threat is in an area where PITs are not deemed to be in danger (Intrinsic Motivation). Existing practices where the implication could probably be refined if the need is great enough included:

- Merit Pay practices (larger stakes?)
- Promotions (more focus on tournament theory?)

Mr T. Rainer will have to determine whether the need is great enough to justify the added cost which will be in the form of a larger Salary expense for Efficiency Wages.

2D: Risk Analysis

Instead of using the DSS to identify Opportunities for Improvement (OFIs) the DSS could also be used to identify threats or risks. The purpose of this exercise would not be to decide what Incentive Mechanisms (IMs) to use, but to be aware of the risks that the current configuration presents. Being aware of the risks allows mitigation practices to be improved.

2D1: Risk from Current Practices According to CEMs.

If Mr T. Rainer wanted to do a basic risk analysis on the IMs currently being used (Profit-sharing, Merit Pay, Recognition Plans, Promotions) he could utilise Link Model IM→PIC or the Cascading Effects Models (CEMs). The negative links noted on the right of the PICs on the CEMs, as shown in Figure F-21, should be considered. Each negative link can then be analysed for PITs at LMC. This is repeated with the CEMs for each of the IMs currently implemented. In order to help with understanding the magnitude of each risk Mr T. Rainer could assign a likelihood and severity to each link to obtain a score indicating how serious each risk is. The results of such an endeavour is show on Table F-19:

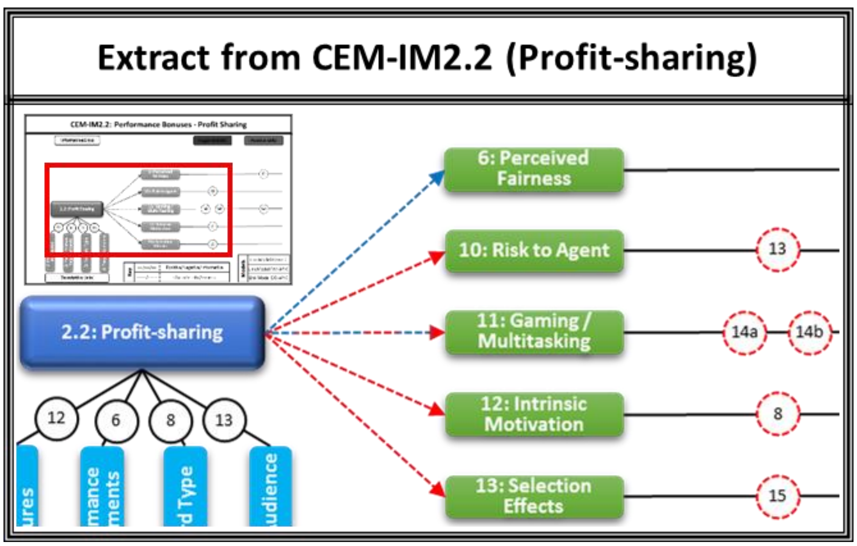


Figure F-21: Risk or dangers to PICs associated with Profit-sharing

Table F-19: The risks or dangers associated with the current IM used for PITs at LMC

	Link*	Discussion	Conclusion	Likelihood (0 to 5)	Severity (0 to 5)	Score (0 to 25)
Profit-sharing	IM→PIC13(FIM→PIC3) – [**Gainsharing and Profit-sharing uses objective performance measures which exposes employees to certain risks**: See link FIM→PIC3 (FIM→PIC3 = Objective measures impose common risks on employees while subjective measures impose trust related risks on employees: see database for more details)]	The use of objective measures expose PITs to common risks that are outside of their control. As Profit-sharing is not an integral part of PIT motivation, nor contains any downside risk, the scope or severity of this danger is limited.	Profit-sharing places PITs at risk of not receiving a reward due to factors outside their control. Stakes are however small.	3	1	3
	IM→PIC14a(FIM→PIC4) – [**Gainsharing and Profit-sharing uses objective performance measures which are typically more susceptible to gaming**: See link FIM→PIC4. Note that, specifically with Profit-sharing, the measures tend to be hard to game for low level employees. (FIM→PIC4 = The more subjective performance measures are the less susceptible they are to gaming: see database for more details)]	While objective measures are susceptible to gaming low level employees like PITs cannot materially affect the measures for Profit-sharing. The risk of gaming is thus immaterial for PITs in relation to Profit-sharing.	Profit-sharing causes no material risk of gaming.	0	2	0
	IM→PIC14b (FIM→PIC20a)	The effects of Profit-sharing will be muted by social loafing. PITs are unlikely to experience sufficient line of sight in terms of affecting the measures for Profit-sharing to be motivated by it. There is however no material downside risk or danger for PITs specifically.	No significant motivational effects are expected from Profit-sharing, yet no material risk to PITs are introduced.	4	0	0
	IM→PIC8 (FIM→PIC17)	The tangible reward used by Profit-sharing can have a negative effect on Intrinsic Motivation via the crowding out effect. As the relative stake of the Profit-sharing bonus is small for PITs this effect is not expected to be large.	Profit-sharing may have a slight negative affect on Intrinsic Motivation.	1	2	2
	IM→PIC15 (FIM→PIC22)	Profit-sharing practices will not attract higher performing employees, group-based pay may even have unfavourable sorting effects. As Profit-sharing makes up a very small part of PIT Incentive Mechanisms the risk of Profit-sharing having a negative sorting effect for PITs is immaterial.	Profit-sharing introduces a very small risk of unfavourable sorting.	1	1	1
Merit Pay	IM→PIC27 (FIM→PIC2, 6,14)	Merit Pay plans can have a negative effect on Perceived Fairness in part due to the complicated nature of the program. In this case the reliance on subjective measures aggravate this (FIM→PIC2). The effects are mitigated as the Merit Pay regime is fairly linear (FIM→PIC6) and moderately transparent.	Merit Pay can harm Perceived Fairness.	2	2	4

	IM→PIC25b (FIM→PIC20c)	The Merit Pay plan is individually based and can hence have a negative effect on cooperation. PITs a LMC work with little Task Interdependence; cooperation concerns are thus muted.	Cooperation is negatively affected by Merit Pay. This is of little consequence for PITs.	3	1	3
	IM→PIC28 (FIM→PIC4, FIM→PIC5)	As Merit Pay for PITs at LMC is not relative or tournament-based, destructive competitive behaviour is not instigated by the plan. The reliance on subjective measures does however give employee an incentive to curry favour instead of optimising performance (FIM→PIC4).	Merit Pay may cause PITs to waste time currying favour instead of optimising performance.	3	3	9
	IM→PIC26 (FIM→PIC17)	The tangible reward used by Merit Pay can have a negative effect on Intrinsic Motivation via the crowding out effect. While the stake size is not large enough that it is expected to crowd out Intrinsic Motivation, it is significant enough to take note of.	Merit Pay may have some negative affect on Intrinsic Motivation.	2	2	4
Recognition	IM→PIC38 (FIM→PIC7)	Recognition Plans can place employees at risk of not receiving the Recognition that they work for or feel they deserve. The Recognition Plans for PITs at LMC are not linear which increase this risk (FIM→PIC7). This effect is muted by the lack of transparency and predictability of the Recognition Plans at LMC.	Recognition Plans put employees at some risk of exerting effort without receiving the reward.	2	1	2
	IM→PIC39	The reliance of Recognition Plans on subjective measures gives employee an incentive to curry favour instead of optimising performance (FIM→PIC4). As the stake is low, transparency is low, and predictability is low, the effects are muted.	Merit Pay may, to a limited degree, cause PITs to waste time currying favour instead of optimising performance.	2	2	4
Promotions	IM→PIC52 (FIM→PIC11, FIM→PIC23)	As Promotions are tournament-based PITs are given some incentive not to help their competitors, or fellow PITs. The danger is however muted for two reasons. Firstly PITs work independently of each other, while there is some scope for helping and assisting with each other's training, the danger of competitiveness is limited. Secondly, even though the IM is tournament-based, it is different from a single-period-first-past-the-post scenario. In reality the PIT program could be better modelled as working with a milestone system; once a PIT has learned enough the PIT can be promoted. Some aspects of tournaments do remain as the best candidate will be picked for a specific promotion. In short complications are limited as the setting is not purely a team setting, and the Promotions are not purely tournament-based.	Promotions may do some harm to cooperation among PITs; the harm is not expected to be significant.	1	3	3
	IM→PIC53 (FIM→PIC14)	Again, as described alongside link IM→PIC52, Promotions for PITs are not perfect tournaments. The harm to Perceived Fairness is thus muted.	Promotions may do some harm to Perceived Fairness.	3	2	6

	IM→PIC54 (FIM→PIC9)	The Promotion practices at LMC for PITs will send negative competency signals to PITs who take long to be promoted, this harms Perceived Competence. Employees who take really long and suffer significant damage to their Perceived Competence may not be the employees LMC wants to promote. Keep in mind that the PIT program is in essence a training program for prospective new employees. The danger or risk in this case is that PITs who perform moderately well and take slightly longer to be promoted, which could be due to external factors, also suffers damage to their Perceived Competence.	The Promotion practices at LMC can harm the Perceived Competence of employees who take longer to be promoted.	2	3	6
	IM→PIC55a	It is noted that Promotions, as any incentive, only motivates those who have a chance of satisfying the required performance measures. In this case most PITs eventually get promoted. In any case no risk is present, aside from the motivator being ineffectual.	No risks are presented.	0	0	0
	IM→PIC55b	As a PIT being promoted does not remove the opportunity for other Promotions, in this scenario the negative effect of link IM→PIC55b is not applicable. No risk is present, aside from the motivator being ineffectual.	No risks are presented	0	0	0
	IM→PIC55c (FIM→PIC11)	See link IM→PIC52. In short complications are limited as the setting is not purely a team setting, and the Promotions are not purely tournament-based.	Promotion may cause some room for gaming in team settings.	1	3	3
	IM→PIC57a	Negative Selection Effects are applicable, not in terms of the employees that become PITs, but in terms of the PITs that are promoted. While this issue is common with front-line employees and front-line managers, it is not expected to be an issue here due to the nature and structure of the PIT program.	Promotions of PITs can cause a sub-optimal resource allocation problem.	2	2	4

*The information contained in the links is not included here for brevity's sake, it can be found in the database. This excludes link IM→PIC13 and IM→PIC14a to demonstrate how the link and discussion fit together.

Based on this analysis Mr T. Rainer becomes aware of the follow notable risks:

- Profit-sharing – No significant risks are presented to PITs. This is largely due to the relatively small role Profit-sharing plays for PITs. While no material risks are introduced, the incentivising effects for PITs are also expected to be limited.
- Merit Pay – Some risks worth noting that are introduced by Merit Pay are:
    - Merit Pay may cause PITs to waste time currying favour instead of optimising performance (9/25).
    - Merit Pay can harm Perceived Fairness (4/25).
    - Merit Pay may have some negative affect on Intrinsic Motivation (4/25).
- Recognition – Risks are limited:
    - Merit Pay may, to a limited degree, cause PITs to waste time currying favour instead of optimising performance (4/25).

- Promotions – Promotions lead to some notable risks, especially due to the reliance on subjective measures:
    - Promotions may do some harm to Perceived Fairness (6/25).
    - The Promotion practices at LMC can harm the Perceived Competence of employees who take longer to be promoted (6/25).
    - Promotions of PITs can cause a sub-optimal resource allocation problem (4/25).

These risks are based on the subjective judgement of Mr T. Rainer guided by the DSS. They form a useful highlight of the risks due to the current incentive practices. Being aware of the risks helps with their mitigation. In this case the biggest risk was the incentive PITs are given to waste time currying favour instead of optimising performance.

Appendix F.2.3) Review – HICS2

Table 17-2 discusses what aspects of the DSS was demonstrated, and how this improves decision-making in each subsection of Appendix F.2:

Table 17-2: Review of HICS2 – LMC

Section	Goal	What aspects of the DSS was demonstrated	How decision-making is improved
2A1	• Survey how appropriate the various IMs are in a specific setting.	• CEMs used to gauge how appropriate IMs are in a specific setting.	• Appropriate IMs can be identified with ease.
2A2	• Determine whether a specific IM is appropriate.	• CEM4.1 for a summary and characteristic links. • Link Model FIM→PIC used to find further considerations (threats and opportunities).	• A summary of the Pros and Cons of a specific IM is derived.
1B	• Identify Opportunities for Improvement (OFIs). • Identify unhealthy PICs.	• The ILM Segments.	• Course of action can be decided as Opportunities for Improvement are identified (OFIs). • Important links for specific PICs in current setting is highlighted.
2C1	• Quickly identify OFIs for a specific PIC.	• Quick use of an ILM Segment.	• OFIs can be identified quickly.
2C2	• Pros and Cons as well as feasibility check.	• CEM's summary of pros and cons	• Quick identification of pros and cons.
2D1	• Identify risk associated with current practices	• CEM's function of highlighting Threats	• Provides a way for users to quickly identify risks.

Appendix G – Images of Completed Questionnaire Forms

This appendix contains images of the hard copies of the questionnaire forms as filled in by the interviewees. Each subsection contains the 'Validation Questionnaire – Likert Scale' (as seen on Table 18-3) and the 'Validation Questionnaire – Additional feedback and comments' form (as seen on Table 18-4). The forms are discussed in Chapter 18.5.2.

Appendix G.1 – Questionnaire hard copy for Mr A

Table G-1: Image of Completed 'Validation Questionnaire – Likert Scale' form for Mr A

Validation Questionnaire: To what extent do you agree with the following questions?									
Example	E – The DSS's user interface is well developed.	Disagree Strongly	Disagree Moderately	Disagree Slightly	C Agree Slightly	Agree Moderately	M Agree Strongly		No answer, more information required
		Further comments: The "M" is only required when the development of a mature user interface would materially alter the answer.							
Purpose	1 – The DSS addresses an existing need.	Disagree Strongly	Disagree Moderately	Disagree Slightly	Agree Slightly	Agree Moderately	C Agree Strongly		No answer, more information required
		Further comments:							
Performance	2 – The DSS can be used to improve practices regarding employee incentives.	Disagree Strongly	Disagree Moderately	Disagree Slightly	Agree Slightly	Agree Moderately	C Agree Strongly		No answer, more information required
		Further comments:							
	3 – The DSS improves decision making in terms of quality.	Disagree Strongly	Disagree Moderately	Disagree Slightly	Agree Slightly	Agree Moderately	C Agree Strongly		No answer, more information required
		Further comments:							
	4 – The DSS improves decision making in terms of speed.	Disagree Strongly	Disagree Moderately	Disagree Slightly	C Agree Slightly	Agree Moderately	M Agree Strongly		No answer, more information required
		Further comments:							
	5 – The DSS is easy to use, i.e. it can be used by non-experts.	Disagree Strongly	Disagree Moderately	Disagree Slightly	Agree Slightly	C Agree Moderately	M Agree Strongly		No answer, more information required
		Further comments:							
Setting	6 – The DSS is suitable for use in organisations where individuals, groups, or work units, form a complex integrated system.	Disagree Strongly	Disagree Moderately	Disagree Slightly	Agree Slightly	Agree Moderately	C Agree Strongly		No answer, more information required
		Further comments:							
Functionality	7 – The DDS is able to make users aware of the most important considerations.	Disagree Strongly	Disagree Moderately	Disagree Slightly	Agree Slightly	Agree Moderately	C Agree Strongly		No answer, more information required
		Further comments:							
	8 – The DSS can be used to assess current practices.	Disagree Strongly	Disagree Moderately	Disagree Slightly	Agree Slightly	Agree Moderately	C Agree Strongly		No answer, more information required
		Further comments:							
	9 – The DSS can be used to identify opportunities for improvement.	Disagree Strongly	Disagree Moderately	Disagree Slightly	Agree Slightly	Agree Moderately	C Agree Strongly		No answer, more information required
		Further comments:							
	10 – The DSS can be used to identify threats/dangers/risks.	Disagree Strongly	Disagree Moderately	Disagree Slightly	Agree Slightly	Agree Moderately	C Agree Strongly		No answer, more information required
		Further comments:							

Table G-2: Image of Completed 'Validation Questionnaire – Additional feedback and comments' for Mr A

<table>
<tr><th colspan="3">Additional Feedback and Comments</th></tr>
<tr><td colspan="2">12 – Have you used any tools that could fulfil the role of the DSS, even if only in part? If so, what tools?</td><td>Not formal tools but frameworks and simple checklists to ensure that all first order effects of performance management system have been considered</td></tr>
<tr><td colspan="2">13 – How likely would you be to recommend the DSS to friends, colleagues, or acquaintances who are involved with the design or optimisation of employee incentive practices?</td><td>With the current user interface:
1 | 2 | 3 | 4 | 5 | 6 | X | 8 | 9 | 10
With a mature user interface:
1 | 2 | 3 | 4 | 5 | 6 | 7 | X | 9 | 10</td></tr>
<tr><td>14 – Regarding shortcomings: It would be helpful if the DSS....</td><td rowspan="2">While feedback surrounding the current or mature UI are welcome, consider also the DSS as a whole (Functionality, Approach, Knowledge/Model Base, etc.)</td><td>N/A</td></tr>
<tr><td>15 – Regarding concerns: I am concerned that the DSS...</td><td>N/A</td></tr>
<tr><td colspan="2">16 – Additional feedback or comments:</td><td>SEEMS TO BE A COMPREHENSIVE AND WELL THOUGHT THROUGH RESEARCH EFFORT.</td></tr>
</table>

Appendix G.2 – Questionnaire hard copy for Dr B

Table G-3: Image of Completed 'Validation Questionnaire – Likert Scale' form for Dr B

Validation Questionnaire: To what extent do you agree with the following questions?

Example	E – The DSS's user interface is well developed.	Disagree Strongly	Disagree Moderately	Disagree Slightly	C Agree Slightly	Agree Moderately	M Agree Strongly	No answer, more information required
		Further comments: The "M" is only required when the development of a mature user interface would materially alter the answer.						
Purpose	1 – The DSS addresses an existing need.	Disagree Strongly	Disagree Moderately	Disagree Slightly	Agree Slightly	Agree Moderately	Agree Strongly	No answer, more information required
		Further comments: CURRENT DEBATES AROUND SUBJECT.						
Performance	2 – The DSS can be used to improve practices regarding employee incentives.	Disagree Strongly	Disagree Moderately	Disagree Slightly	Agree Slightly	Agree Moderately	Agree Strongly	No answer, more information required
		Further comments: ALTERNATIVES - TO BE CONSIDERED						
	3 – The DSS improves decision making in terms of quality.	Disagree Strongly	Disagree Moderately	Disagree Slightly	Agree Slightly	Agree Moderately	Agree Strongly	No answer, more information required
		Further comments:						
	4 – The DSS improves decision making in terms of speed.	Disagree Strongly	Disagree Moderately	Disagree Slightly	Agree Slightly	Agree Moderately	Agree Strongly	No answer, more information required
		Further comments:						
	5 – The DSS is easy to use, i.e. it can be used by non-experts.	Disagree Strongly	Disagree Moderately	Disagree Slightly	Agree Slightly	Agree Moderately	Agree Strongly	No answer, more information required
		Further comments:						
Setting	6 – The DSS is suitable for use in organisations where individuals, groups, or work units, form a complex integrated system.	Disagree Strongly	Disagree Moderately	Disagree Slightly	Agree Slightly	Agree Moderately	Agree Strongly	No answer, more information required
		Further comments: SPECIFICALLY - UNIONS.						
Functionality	7 – The DDS is able to make users aware of the most important considerations.	Disagree Strongly	Disagree Moderately	Disagree Slightly	Agree Slightly	Agree Moderately	Agree Strongly	No answer, more information required
		Further comments:						
	8 – The DSS can be used to assess current practices.	Disagree Strongly	Disagree Moderately	Disagree Slightly	Agree Slightly	Agree Moderately	Agree Strongly	No answer, more information required
		Further comments: WOULD INFLUENCE CLIMATE AND CULTURE POSITIVE						
	9 – The DSS can be used to identify opportunities for improvement.	Disagree Strongly	Disagree Moderately	Disagree Slightly	Agree Slightly	Agree Moderately	Agree Strongly	No answer, more information required
		Further comments:						
	10 – The DSS can be used to identify threats/dangers/risks.	Disagree Strongly	Disagree Moderately	Disagree Slightly	Agree Slightly	Agree Moderately	Agree Strongly	No answer, more information required
		Further comments: IF USED CORRECTLY.						

Table G-4: Image of Completed 'Validation Questionnaire – Additional feedback and comments' for Dr B

Additional Feedback and Comments		
12 – Have you used any tools that could fulfil the role of the DSS, even if only in part? If so, what tools?		
13 – How likely would you be to recommend the DSS to friends, colleagues, or acquaintances who are involved with the design or optimisation of employee incentive practices?		*With the current user interface:* 1 · 2 · 3 · 4 · 5 · 6 · 7 · 8 · 9 · 10 *With a mature user interface:* 1 · 2 · 3 · 4 · 5 · 6 · 7 · 8 · 9 · 10
14 – Regarding shortcomings: It would be helpful if the DSS….	*While feedback surrounding the current or mature UI are welcome, consider also the DSS as a whole (Functionality, Approach, Knowledge/Model Base, etc.)*	
15 – Regarding concerns: I am concerned that the DSS…		DSS is a good system. — Success lie's in the implementation. and connection – with the workforce / employees/
16 – Additional feedback or comments:		

Appendix G.3 – Questionnaire hard copy for Mrs C

Table G-5: Image of Completed 'Validation Questionnaire – Likert Scale' form for Mrs C

Validation Questionnaire: To what extent do you agree with the following questions?

	Question	Disagree Strongly	Disagree Moderately	Disagree Slightly	Agree Slightly	Agree Moderately	Agree Strongly	No answer, more information required	Further comments
Example	E – The DSS's user interface is well developed.				C		M		The "M" is only required when the development of a mature user interface would materially alter the answer.
Purpose	1 – The DSS addresses an existing need.					X			
Performance	2 – The DSS can be used to improve practices regarding employee incentives.				C X	M			M – Taking legislative ~~&~~ socio-political aspect into account – Unions – transform legislation
	3 – The DSS improves decision making in terms of quality.						X		Taking complexities into account.
	4 – The DSS improves decision making in terms of speed.			X	M X				
	5 – The DSS is easy to use, i.e. it can be used by non-experts.			X					Legislative consideration.
Setting	6 – The DSS is suitable for use in organisations where individuals, groups, or work units, form a complex integrated system.					X			Start up organisations X Mature Organisations Disagree Slightly
Functionality	7 – The DDS is able to make users aware of the most important considerations.						X		
	8 – The DSS can be used to assess current practices.					X			
	9 – The DSS can be used to identify opportunities for improvement.				X				If combine with employee input.
	10 – The DSS can be used to identify threats/dangers/risks.				X				Unionise employees.

Table G-6: Image of Completed 'Validation Questionnaire – Additional feedback and comments' for Mrs C

<table>
<tr><th colspan="3">Additional Feedback and Comments</th></tr>
<tr><td colspan="2">12 – Have you used any tools that could fulfil the role of the DSS, even if only in part? If so, what tools?</td><td>No</td></tr>
<tr><td colspan="2">13 – How likely would you be to recommend the DSS to friends, colleagues, or acquaintances who are involved with the design or optimisation of employee incentive practices?</td><td>With the current user interface:
1 | 2 | 3 | 4 | 5 | 6 X | 7 | 8 | 9 | 10
With a mature user interface:
1 | 2 | 3 | 4 | 5 | 6 X | 7 | 8 | 9 | 10</td></tr>
<tr><td>14 – Regarding shortcomings: It would be helpful if the DSS....</td><td rowspan="2">While feedback surrounding the current or mature UI are welcome, consider also the DSS as a whole (Functionality, Approach, Knowledge/Model Base, etc.)</td><td></td></tr>
<tr><td>15 – Regarding concerns: I am concerned that the DSS...</td><td></td></tr>
<tr><td colspan="2">16 – Additional feedback or comments:</td><td>-) Very useful for educational purposes
- Managers (MBA)
- HR professionals

-) Transformational legislation
- Share Schemes
- EE</td></tr>
</table>

Appendix G.4 – Questionnaire hard copy for Mr D

Table G-7: Image of Completed 'Validation Questionnaire – Likert Scale' form for Mr D

Validation Questionnaire: To what extent do you agree with the following questions?

Example	E – The DSS's user interface is well developed.	Disagree Strongly	Disagree Moderately	Disagree Slightly	C Agree Slightly	Agree Moderately	M Agree Strongly		No answer, more information required
		Further comments: The "M" is only required when the development of a mature user interface would materially alter the answer.							
Purpose	1 – The DSS addresses an existing need.	Disagree Strongly	Disagree Moderately	Disagree Slightly	Agree Slightly	Agree Moderately	C Agree Strongly		No answer, more information required
		Further comments:							
Performance	2 – The DSS can be used to improve practices regarding employee incentives.	Disagree Strongly	Disagree Moderately	Disagree Slightly	Agree Slightly	Agree Moderately	C Agree Strongly		No answer, more information required
		Further comments:							
	3 – The DSS improves decision making in terms of quality.	Disagree Strongly	Disagree Moderately	Disagree Slightly	Agree Slightly	C Agree Moderately	M Agree Strongly		No answer, more information required
		Further comments:							
	4 – The DSS improves decision making in terms of speed.	Disagree Strongly	Disagree Moderately	Disagree Slightly	Agree Slightly	C Agree Moderately	M Agree Strongly		No answer, more information required
		Further comments:							
	5 – The DSS is easy to use, i.e. it can be used by non-experts.	Disagree Strongly	Disagree Moderately	Disagree Slightly	C Agree Slightly	Agree Moderately	M Agree Strongly		No answer, more information required
		Further comments:							
Setting	6 – The DSS is suitable for use in organisations where individuals, groups, or work units, form a complex integrated system.	Disagree Strongly	Disagree Moderately	Disagree Slightly	Agree Slightly	Agree Moderately	C Agree Strongly		No answer, more information required
		Further comments:							
Functionality	7 – The DDS is able to make users aware of the most important considerations.	Disagree Strongly	Disagree Moderately	Disagree Slightly	Agree Slightly	Agree Moderately	C Agree Strongly		No answer, more information required
		Further comments:							
	8 – The DSS can be used to assess current practices.	Disagree Strongly	Disagree Moderately	Disagree Slightly	Agree Slightly	Agree Moderately	C Agree Strongly		No answer, more information required
		Further comments:							
	9 – The DSS can be used to identify opportunities for improvement.	Disagree Strongly	Disagree Moderately	Disagree Slightly	Agree Slightly	Agree Moderately	C Agree Strongly		No answer, more information required
		Further comments:							
	10 – The DSS can be used to identify threats/dangers/risks.	Disagree Strongly	Disagree Moderately	Disagree Slightly	Agree Slightly	Agree Moderately	C Agree Strongly		No answer, more information required
		Further comments:							

Table G-8: Image of Completed 'Validation Questionnaire – Additional feedback and comments' for Mr D

Additional Feedback and Comments		
12 – Have you used any tools that could fulfil the role of the DSS, even if only in part? If so, what tools?		
13 – How likely would you be to recommend the DSS to friends, colleagues, or acquaintances who are involved with the design or optimisation of employee incentive practices?		*With the current user interface:* 1 | 2 | 3 | 4 | 5 | 6 | ~~7~~ | 8 | 9 | 10 *With a mature user interface:* 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10
14 – Regarding shortcomings: It would be helpful if the DSS….	*While feedback surrounding the current or mature UI are welcome, consider also the DSS as a whole (Functionality, Approach, Knowledge/Model Base, etc.)*	
15 – Regarding concerns: I am concerned that the DSS…		
16 – Additional feedback or comments:		

Appendix H – Validation: Results with Worst Case 5th and 6th Expert Interviews

Table H-1 shows what the feedback results would look like for a worst case 5th and 6th interview as discussed in Chapter 18.5.1. The calculations are illustrated on Table H-2.

Table H-1: The median feedback from interviewees – Adapted for worst case 5th and 6th interviews

Validation Questionnaire: To what extent do you agree with the following questions?											
	Disagree Strongly		*Disagree Moderately*		*Disagree Slightly*		*Agree Slightly*		*Agree Moderately*		*Agree Strongly*
1										**C/M**	
2									**C**	**M**	
3											**C/M**
4						**C**			**M**		
5						**C**	**M**				
6										**C/M**	
7											**C/M**
8										**C/M**	
9									**C/M**		
10									**C/M**		

As discussed in Chapter 18.5.1 it is assumed that the 5th and 6th interview is very unlikely to be worse that the 3rd interview. Table H-2 indicates how the median feedback points would be calculated if the 5th and 6th interview had the same results as the 3rd interview. The median point is thus taken between the third and fourth 'C' and 'M' on for each item. Note that where no 'M' is present, it is in the same position as the 'C'.

Table H-2: An overview of questionnaire feedback – Red indicates worst case 5th and 6th interviews

<table>
<tr><th colspan="26">Validation Questionnaire: To what extent do you agree with the following questions?</th></tr>
<tr><th></th><th colspan="4">Disagree Strongly</th><th colspan="4">Disagree Moderately</th><th colspan="4">Disagree Slightly</th><th colspan="4">Agree Slightly</th><th colspan="4">Agree Moderately</th><th colspan="4">Agree Strongly</th><th></th></tr>
<tr><td rowspan="5">1</td><td colspan="4"></td><td colspan="4"></td><td colspan="4"></td><td colspan="4"></td><td colspan="4"></td><td colspan="4">C</td><td>Mr A</td></tr>
<tr><td colspan="4"></td><td colspan="4"></td><td colspan="4"></td><td colspan="4"></td><td colspan="4"></td><td colspan="4">C</td><td>Dr B</td></tr>
<tr><td colspan="4"></td><td colspan="4"></td><td colspan="4"></td><td colspan="4"></td><td colspan="4">C+C+C</td><td colspan="4"></td><td>Mrs C</td></tr>
<tr><td colspan="4"></td><td colspan="4"></td><td colspan="4"></td><td colspan="4"></td><td colspan="4"></td><td colspan="4">C</td><td>Mr D</td></tr>
<tr><td></td><td colspan="2"></td><td colspan="2"></td><td colspan="2"></td><td colspan="2"></td><td colspan="2"></td><td colspan="2"></td><td colspan="2"></td><td colspan="2"></td><td colspan="2"></td><td colspan="2">C/M</td><td colspan="2">C/M</td><td></td><td>Median</td></tr>
<tr><td rowspan="5">2</td><td colspan="4"></td><td colspan="4"></td><td colspan="4"></td><td colspan="4"></td><td colspan="4">M</td><td colspan="4">C</td><td>Mr A</td></tr>
<tr><td colspan="4"></td><td colspan="4"></td><td colspan="4"></td><td colspan="4"></td><td colspan="4">M</td><td colspan="4">C</td><td>Dr B</td></tr>
<tr><td colspan="4"></td><td colspan="4"></td><td colspan="4"></td><td colspan="4">C+C+C</td><td colspan="4">M+M+M</td><td colspan="4"></td><td>Mrs C</td></tr>
<tr><td colspan="4"></td><td colspan="4"></td><td colspan="4"></td><td colspan="4"></td><td colspan="4"></td><td colspan="4">C</td><td>Mr D</td></tr>
<tr><td></td><td colspan="2"></td><td colspan="2"></td><td colspan="2"></td><td colspan="2"></td><td colspan="2"></td><td colspan="2"></td><td colspan="2"></td><td colspan="2"></td><td colspan="2">C</td><td colspan="2">M</td><td colspan="2">C/M</td><td></td><td>Median</td></tr>
</table>

	Disagree Strongly		Disagree Moderately		Disagree Slightly		Agree Slightly		Agree Moderately		Agree Strongly	
3											C	Mr A
									C			Dr B
											C+C+C	Mrs C
									C		M	Mr D
										C	M+C/M	Median
4							C				M	Mr A
											C	Dr B
					C+C+C		M+M+M					Mrs C
									C		M	Mr D
						C		C	M		M	Median
5									C		M	Mr A
									C			Dr B
					C+C+C							Mrs C
							C				M	Mr D
						C	M	C		M		Median
6											C	Mr A
											C	Dr B
									C+C+C			Mrs C
											C	Mr D
										C/M	C/M	Median
7											C	Mr A
											C	Dr B
											C+C+C	Mrs C
											C	Mr D
											C/M+C/M	Median
8											C	Mr A
											C	Dr B
									C+C+C			Mrs C
											C	Mr D
										C/M	C/M	Median
9											C	Mr A
											C	Dr B
							C+C+C					Mrs C
											C	Mr D
									C/M		C/M	Median
10											C	Mr A
											C	Dr B
							C+C+C					Mrs C
											C	Mr D
									C/M		C/M	Median